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## Action on America's Foreign Trade

ACTION replaces consultation in the development of American foreign trade. A fifty-million-dollar corporation organized on a business basis to secure results has been formed by a group of American business men whose names and records in commerce are a guarantee of the practicability of the plan and an assurance that the American International Corporation which they have formed will give the United States a place in the world trade. Accustomed as we have become during the last year to momentous undertakings, it is doubtful whether any single development in the remarkable commercial and financial situations which are the outcome of the European war has greater significance in the history of commerce in the United States. The home market has been the principal interest of the American business man. He has been apathetic toward foreign trade, not because he did not see its possibilities but because the demands at home in general have needed his full attention. Nor have these conditions at home been changed. Emphasis on the possibilities of the foreign market should not lead us to forget that the intensive development of our home market is only begun. But conditions internationally have changed. The United States for the first time in its history has been placed in a remarkable position commercially and financially. As a nation of commerce we have had the responsibility for constructive world development put up to us. There is a feeling of pride that we can rise to take this responsibility and that leaders in electrical enterprises are prominent among the group who have turned debate into action.

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## Public Interest in Electricity

NEXT week will see the culmination of a movement within the industry for which many have worked with an enthusiasm and a persistency that merit the commendation of all. Electrical Prosperity Week is a test of the public's interest in what every electrical man is apt to assume is naturally of interest. The point of contact between the public and the industry is one of the fundamental considerations in any summary of the work of the Society for Electrical Development and the enterprises which have fostered it. Those of us within the industry, both technical and business men, sometimes assume that the circle of activities which appeals to us interests everyone. It is human to believe that those not interested in our viewpoint are outside the pale anyway and the less concern we have with them the better for us and the industry. Electricity to the technical men within it is a physical science and a profession of applied engineering. Those of us who are engineers are interested in the problems of the industry in technical advance in theory and practice. To those outside it—the public—electricity is Martian, a mysterious force, with the appeal of the unknown. For them it must be interpreted in terms of what it can do. The success of the industry in widening the application of electricity depends in no small measure on the ability of the men in it to interpret its advantages to the public from the public's viewpoint.

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## Mechanical Models of Electrically Conducting Lines

ELECTRICALLY conducting lines present a great variety of electrical phenomena, some of which may be classified, from the commercially operative standpoint, as behavior, and the remainder as misbehavior. This classification is, of course, a mere cataloging of knowledge versus ignorance; because, as soon as the nature of a line's misbehavior becomes clearly apprehended and enters into the visible horizon of the intelligence, it can almost always be controlled and so converted into behavior. Nevertheless, the range and complexity of the phenomena stand in the way of proper understanding, because the electromagnetic actions are beyond the direct recognition of our senses.

In the last few years we have succeeded in producing laboratory models of various types of line, so that we now have artificial submarine telegraph cables, artificial telephone cables, artificial power-transmission lines, and even artificial radio-antennas. These models are of great help in becoming familiar with the phenomena of the lines imitated; but they have to be studied with the aid of electric apparatus, because the electromagnetic action of a model is again beyond direct human sense perception. By experimenting on the models we acquire accurate electrical knowledge, but still we see only as in a glass, darkly, and not face to face.

Certain mechanical models for presenting pictures of actions, corresponding to electromagnetic actions in the imitated line, have been known for some time—notably those of Fleming. These, however, have been limited to presenting the phenomena of transmission of sinusoidal alternating-current waves, both in the unsteady and steady states, over various types of line.

In a recent number of the *Elektrotechnische Zeitschrift*, Dr. Breisig describes a type of mechanical model upon which not only alternating-current propagation but also transient disturbances can be presented, within certain limitations, and watched by the observer. It consists of a number of wooden bars or prisms, mounted side by side on a common axis, which is at right angles

to their lengths. The inertia of these bars corresponds to the electric inertia, or inductance, of a certain section of line, the inelasticity of the interconnecting metallic springs to the capacity of the section, frictional resistance to electric resistance, and angular displacement to electric quantity. An angular disturbance, communicated to the model, propagates itself at a definite speed from one end to the other, and back again by reflection.

The quantitative results that can be obtained from such a mechanical model line are necessarily much more limited than those which can be obtained on an electrical model or artificial electric line—but they are much more easily produced and apprehended.

## The Stevens Creek Power Development

THERE is a certain sameness in power transmission systems. Most of them fall into one of a very few conventional types, and instances are rare in which the engineering has to pass beyond the specifications of the manufacturer's catalog. Now and then, however, circumstances arise which lead to combinations of interest and make a plant worthy of more than a perfunctory and casual description. The Stevens Creek plant of the Georgia-Carolina Power Company, described in this and the preceding issue of the ELECTRICAL WORLD, falls into the genus of low-head developments such as are on the whole characteristic of the Southern Appalachian country. Only now and then do the streams which carry the run-off of this district of large rainfall present any considerable declivities, and the region likewise is as a whole barren of storage except in so far as it is procured artificially. Despite these somewhat unfavorable conditions, the Savannah River in the vicinity of Augusta was one of the early water-power developments of the South, a most commendable example of municipal foresight and activity more than half a century ago. As far back as 1847 the municipality of Augusta provided a canal to furnish water-power to the industries within its territory, and water-power is still sold from this old development. As the era of electrical power transmission has come in, further supply of power was destined to be brought by new methods rather than by old, and hence the installation of this Stevens Creek station.

The low head brought its usual hydraulic difficulties, which were met, as is not infrequently the case, by installing umbrella-type generators driven by vertical turbines at the unusually low speed of 75 r.p.m., the turbines themselves being of single-runner design. The comparatively small size of the units caused by hydraulic requirements led to an arrangement of transformers which is a little out of the ordinary and would not generally be employed. The whole power of the plant as it at present exists is handled by three three-phase transformers, each of 5400 kva., which raise the voltage from 2300 to 44,000. Each of these transformers can at a pinch take care of the energy from two generators, so that we have the general condition of two generators pumping into one transformer instead of having one or more transformers for each generator. The large size of these transformer units and their water-cooled construction led, of course, to considerable economy, bearing in mind the modest output of the generating units. It is a good example of how the primary conditions imposed by the nature of the hydraulic work may run through the entire design of a plant.

This excellent plant supplies the city of Augusta and also feeds transmission lines with substations at Clearwater and Aiken, S. C. In Augusta is the main substation, which provides, on account of previous local conditions, a two-phase, 2300-volt distribution. Energy received at 44,000 volts and transformed to 13,200 volts furnishes three-phase service to outlying suburbs and to some railway substations.

The transformers at the substation are all water-cooled, and to save the cost in water supply the somewhat unusual expedient has been adopted of treating this transformer cooling water exactly like condenser water where the supply is scant. A small cooling pond is installed with spray nozzles for cooling the water and with suitable circulating apparatus, so that the water is sent through the substation transformer, cooled by spraying, and returned into the cooling pond to be circulated again. The substations on the longer transmission line at Clearwater and Aiken are, like so many recent installations, particularly in the South, of the out-of-doors type, air-cooled and with rather large units —three 750-kw. transformers at each substation. The corrugated cases are painted with white aluminum paint to check the absorption of heat from the sun, a device which might not infrequently be employed to advantage in hot climates, as under favorable conditions it is likely to make considerable difference in the heating.

The Stevens Creek development is, particularly from the hydraulic standpoint, an interesting one, and it has apparently been worked out with that thorough attention to details which is important for securing continuity of service.

## A Constructive Plan of Selling

CENTRAL-STATION selling campaigns have been frowned upon by the local dealer and contractor. Central stations, with some exceptions, have generally taken the position that they wanted to get appliances on the lines where they would increase the load. They have criticised the dealer and contractor for their slowness in pushing the sale of appliances. In their turn the dealers and contractors have said they could not push the lines because the central stations cut prices. They have said that the central station was not interested in selling appliances but in selling energy, and that consequently the central station did not mark the goods it sold at a price that would pay the dealer's and contractor's profit. Meanwhile manufacturers and jobbers have been between the frying-pan and the fire trying to satisfy the market.

Price-cutting without a legitimate merchandising reason has been proved bad policy in retail distribution.

Mere price-cutting to dispose of fresh stock is resorted to only by business men without the stamina to stand up for a fair profit. It is the inefficient merchant's way of getting rid of stock. It can hardly be termed selling. On the other hand, it cannot be denied that so far as the logic of his position is concerned, in so far as he is not interested in profit on appliances, the central-station manager can justify his position in cutting prices for the sake of getting appliances on the line. Often, however, sound business policy and judgment deny that which is merely logical. The central station, manufacturer, dealer, jobber and contractor all want to live and let live. The central station is not interested in price as price, but in getting more current-carrying devices on its lines. If quantity sales can be made in a community without demoralizing prices, no central station would favor price-cutting. A constructive plan of action was announced at the recent jobbers' convention at Hot Springs, Va., which should make for harmony of action. Briefly it means that the jobbers and central stations form a partnership for the sale of goods in a community under a set of conditions both agree to. The details are explained in the news columns. The policy of co-operation behind the plan is constructive and admirable.

## Fitting Standards to Practice

THE Illuminating Engineering Society has done well in bringing out so well planned a code to direct improvements in lighting. No code, however, can be made far-reaching enough to enable the lighting problems of industrial works to be solved by rule of thumb. The present code points out certain important matters, like the general amount of illumination required and the necessity of suitable provision for light on vertical planes as well as horizontal planes. These suggestions are valuable, but their application to obtain good results must be made by the skilled engineer, as the code points out. One may have two factories, each provided with distributed general illumination with regard to both horizontal and vertical planes, and yet of the two one will be for its special purposes well lighted and the other badly lighted. The real effectiveness of the illumination depends, in other words, on the character of the machines and the kind of work that is being done. One machine or operation may require particularly strong side illumination to enable work to be turned out easily and rapidly. Another may need over part of its work unusually strong vertical illumination and elsewhere comparatively little. A third case often encountered in practice is the requirement of particularly efficient lighting from some special direction which bears no particular relation to either plane but which does affect directly the inspection of conditions at a particular point. In fact, there is no general rule of factory lighting which can be applied by one ignorant of the technique of illumination. Some of the most valuable hints in illuminating engineering, on the other hand, have come from practical men.

## Convenience in Plant Arrangement

THE tendency to follow the path of least resistance is not solely a characteristic of the electric current. It is a very human trait as well. Ample substantiation of this statement may be found by observing the manner in which employees persist in neglecting or slighting their duties when this can be done with some degree of safety from detection. In the power plant there are numerous minor duties which, if faithfully and conscientiously performed, add appreciably to the efficiency and economy of operation. For example, every fireman knows that he should increase the air supply just after firing green coal, in order that the gases distilled from the fuel may be burned completely before they escape from the boiler. He knows that he ought to maintain the water level between certain fixed limits. He is aware that by altering the setting of the damper to conform to the changing furnace conditions the efficiency of the boiler will be increased. The regular use of the blow-off valve is a matter that has been impressed upon his mind. The fact that he fails to observe all these things punctiliously may be due to a disinclination to work, but very often it can be traced to the inaccessibility of the apparatus. In the case of large boilers, for example, the water column is at a considerable height above the floor, and oftentimes the water level can be determined only by crawling up to a gallery in front of the drum. A properly lighted gage glass or extension to the firing floor would solve the difficulty, as the height of the water in the boiler could then be ascertained with little effort. The failure to use the dampers more wisely cannot well be denounced if the levers by which the dampers are controlled are placed at the back of the boilers, necessitating a trip to the rear of the settings every time an adjustment is made. It is somewhat unjust to censure a fireman for neglecting to blow down his boilers if, upon investigation, the blow-off valve is found placed at the bottom of a pit, forming a veritable death trap should the valve fail, and difficult of access in any case. There are many plants in which much worse examples than those cited are to be discovered. The remedy does not consist in discharging the employee but in removing the cause.

## Editorial Announcement

THIS is the fourth issue of the month, in which emphasis is regularly given to commercial advance in the industry. Last week was devoted largely to engineering and technical development. Next week appears, in the public relations issue of the month, the first of two special articles on the organization and work of the Federal Bureau of Standards at Washington. The second issue of December will contain special articles on the power, generation, transmission and operating phases of the industry.

**Sudden Popularity of Indoor Ice-Skating Results in Long-Hour Refrigeration Loads**

The sudden favor visited upon indoor ice-skating this season by the public of the principal metropolitan centers, in place of the dancing and cabarets which formerly held the boards, has resulted in the installation of a number of artificial ice-skating rinks using electric power for refrigeration and providing corresponding long-hour electric-motor loads. Several New York City hostelries and restaurants are now equipping their erstwhile dance floors with ice tanks and brine coils, in preparation for icy surfaces on which exhibition skating will be shown during intermissions when the guests themselves are not skating. One enterprising restaurant manager is now arranging circuits of colored lamps in the ice, so that when the room is darkened and the lamps of different hue are successively flashed on the illuminated ice will present an attractive spectacle. Under average conditions a rink of 250 sq. ft. area exposed to room temperature can be refrigerated with a 1-ton compressor driven by a 3-hp. motor.

A Chronicle of Events of the Industry and of Important Movements in the Field

# NEWS OF THE WEEK

Reports of Conventions and Meetings of Electrical Associations and Societies

## ORGANIZE TO PROMOTE FOREIGN TRADE

**New Fifty-Million-Dollar Corporation, in Which Prominent Electrical Interests Are Represented, Formed to Foster Use of American Products**

The American International Corporation was incorporated under the laws of New York on Nov. 23, with a capitalization of $50,000,000, for the purpose of establishing trade relations with foreign countries which will help make a market for American products, for financing and protecting developments in foreign countries undertaken by American engineers and manufacturers, and in order to assist in financing the rehabilitation of industries in foreign countries. The company will not engage in a direct banking business, but will have very broad powers.

Of the $50,000,000 capital stock, $49,000,000 will be in common stock and $1,000,000 in managers' shares. The managers' shares will be paid for at par in the same way as the common stock and will have no advantage over the common stock until the common pays more than 7 per cent. In any dividends above 7 per cent one-fifth will be divided among the managers' shares and the remaining four-fifths among the holders of the common stock. Managers' shares can be held only by those actively engaged in managing properties under the direction of the company, and must be sold back to the corporation at their value when connection with the corporation is severed.

It is not proposed to call all of the capital at once. Ten per cent will be called on Dec. 15 and 10 per cent more on Jan. 15. One-half of the common stock will be offered pro rata to the stockholders of the National City Bank of New York. A public offering of the stock will not be made, but that which is not subscribed for by the bank's stockholders, together with the remainder of the stock, will be placed with firms having interests abroad.

Charles A. Stone, head of the firm of Stone & Webster, is the president of the new corporation, and while he will not sever his connection with the engineering corporation, he will devote all of his time to the management of the new venture. R. P. Tinsley, treasurer of the Standard Oil Company, who has been with that corporation for the last twenty-five years, is secretary and treasurer of the new company. The board of directors is made up of twenty men, all of whom have achieved distinct successes in their particular line of business. The following will compose the board: J. Ogden Armour, Armour & Company; Charles A. Coffin, General Electric Company; William E. Corey, Midvale Steel & Ordnance Company; Joseph P. Grace, W. R. Grace & Company; James J. Hill, Great Northern Railway Company; Otto H. Kahn, Kuhn, Loeb & Company; Robert S. Lovett, Union Pacific Railroad Company; Ambrose Monell, International Nickel Company; Henry S. Pritchett, Carnegie Foundation; Percy A. Rockefeller, Standard Oil Company; John D. Ryan, Anaconda Copper Company; Charles H. Sabin, Guaranty Trust Company; William L. Saunders, Ingersoll-Rand Company; James A. Stillman, National City Bank; Charles A. Stone, Stone & Webster; Frank A. Vanderlip, National City Bank; Theodore N. Vail, American Telephone & Telegraph Company; Edwin S. Webster, Stone & Webster; Albert H. Wiggin, Chase National Bank, and Beekman Winthrop, Robert Winthrop & Company.

While it was not possible to include in the board representatives of all of the prominent American firms engaged in international trade, a position on the board is not intended to entitle the members to swing any trade toward the firms of which they are representatives. The whole spirit of the corporation, according to Mr. Stone and Mr. Vanderlip, is one of fair play. The company will be absolutely impartial in the development of American export trade.

In speaking of the reasons for the formation of the corporation, Frank A. Vanderlip said:

"We are in a very extraordinary state of world's affairs. Those sources of capital that ordinarily supplied funds for development of world affairs are closed and are likely to remain closed. Governments need further finances, and they are coming to America for

assistance because America is the only place at the moment that can offer financial aid.

"There are certain difficulties in the way at present. No banking house could offer such assistance, because none has the necessary organization. The new company then must build up a great organization which can properly analyze and handle situations. Another fact that has made this action necessary is that our investors will not invest in foreign securities. The American International Corporation will purchase foreign securities and issue therefor debentures to the American investor.

"The action is regarded as something a great deal more important than money-making. Conditions make it logical at this time, in accordance with the development of the United States along international financial lines."

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## STATUS OF BARE CONCENTRIC WIRE

### Wiring Committee of the Commercial Section of the N. E. L. A. Reports the Progress Thus Far Made in Its Manufacture and Application

At the last meeting of the committee on wiring of the National Electric Light Association, held at the Mohawk Club, Schenectady, N. Y., Nov. 12, the question of the further promotion of bare concentric wire was discussed and the conclusion reached that the central stations should guide the matter, so far as proper, in such a way as to keep the work in the hands of only competent workmen. The question of manufacturers making the fittings was spoken of, and it was the opinion of the committee that it should be made clear that the General Electric Company has been doing development work in response to the request of the committee and that the committee hoped that other manufacturers would do likewise. The committee also stands ready to co-operate with any other manufacturer who may engage in developing concentric wire and fittings, just as it co-operated with the General Electric Company. An inspection was made of the fittings for the bare concentric wire made by the General Electric Company. Circulars with the prices of the fittings were also shown, and it was stated that the General Electric Company would send these out on request, but that it had given instructions to its sales force not to solicit any concentric-wire fitting business. The fittings will be submitted to the Underwriters' Laboratory for report by the General Electric Company, and the attention of the sub-committee of the electrical committee of the National Fire Protection Association will also be brought to the fact that the fittings are now ready.

#### New Type of Panelboard

A panelboard for bare concentric wire will be designed for use of a solid neutral, and a bulletin describing panels for different numbers of circuits will be issued by the Sprague company. This bulletin will be similar to its ordinary bulletin, so that a wireman can order a panelboard for a solid neutral as easily as he can order a panelboard of the ordinary type. It is the expectation of the committee to use these bulletins in calling the attention of wiremen to the saving that can be made by the use of the solid neutral.

Chairman R. S. Hale reported on a meeting with plug and receptacle manufacturers and read a letter from a prominent receptacle manufacturer, after which the following resolution was adopted: "The committee, being strongly in favor of standardization, is glad to note the report of progress in that direction on the part of manufacturers of plugs and receptacles, and hopes that the sentiment already started will bear fruit in the near future."

#### Safety Code

R. S. Hale reported at some length on the conference of electrical interests held in New York recently to consider the safety code proposed by the National Bureau of Standards, and gave as his opinion that such a code will ultimately be established. Such being the case, he thought it best for the interests affected to co-operate with the Bureau of Standards in order that the code may be as free from error as possible. A vote of appreciation was given to Mr. Hale, as well as to the Edison Electric Illuminating Company of Boston for permitting him to devote so much of his time to the safety code work.

Arrangements have been made with the publisher to continue the chapter on house wiring in Cushing's Manual, and to include a short chapter describing bare concentric wire. This will incorporate a statement to the effect that concentric wire has not yet been approved by the National Fire Protection Association for general use, but has only been referred to a sub-committee to obtain further field experience.

#### Color of Neutral Wire

Manufacturers of wire having expressed a preference for black and red colors rather than black and white, there was a general discussion on the color of neutral wire. W. Clark of the wire department of the General Electric Company, who was present by invitation, stated that the reason that the manufacturers preferred red-colored covering to white was because white-colored wire is more likely to get dirty during manufacture and requires some slight extra expense. At one time white-colored wire cost 15 cents more per 1000 ft. than other colored wire. Mr. Davenport of Providence, R. I., stated that black and white were the colors which had been used in Providence for a long time, and that they had proved very satisfactory. He thought that red would not be so satisfactory.

Members of the committee expressed themselves generally as being in favor of wire colored black and white in preference to black and red, and the committee voted that in its opinion the potential-carrying wire should always be black in color and that the neutral wire or grounded wire should be readily distinguished by a color that is essentially white. It was agreed that each member of the committee should consult the wiring contractors in his city, and also the jobbers, so as to get wider views on the matter. It was felt that such a report from each member of the committee, whether it were unanimous or otherwise, would be a much safer basis for a decision than a resolution by the committee itself. It was also understood that Mr. Clark would get information from the manufacturers of wire on what actual troubles and extra costs they have had from shipments of white wire or red wire as they had been made in the past.

R. S. Hale, as chairman of the committee, was appointed a delegate to present to the wire manufacturers at their meeting early in January the result of the report he will receive before that date from the members of the committee.

The question of standardizing the connections on the ends of flexible cords attached to a flatiron or other device was brought up for consideration, and the committee voted to recommend that the connections on the ends of cords be standardized so that any cord for use with devices of 660 watts and under could be used with any of such devices. It was also suggested that the same form of plug be adopted as that attached to the lamp-socket end, and the chairman was requested to take up the matter with the manufacturers. Other topics taken up for discussion in a general way but on which no action was taken were the following:

"Service location and proper notification to wiremen," "licensing contractors," and "city ordinances."

Reports from the different members as to the installation of bare concentric wire in their respective cities will be combined in a general report to be submitted to the National Electric Light Association about February or March. It is expected that the next meeting of the wiring committee will be held late in the spring either shortly before the annual meeting or possibly at that meeting.

## WEST VIRGINIA MANAGERS CONVENE

### Newly Organized Public Utility Association Holds a Two-Day Session at White Sulphur Springs

The Public Utility Association of West Virginia, the membership of which comprises the electric-railway, electric-lighting, water, artificial-gas and telephone companies of the State of West Virginia, held its first convention at White Sulphur Springs on Nov. 18 and 19. As in the case of many other States when public utility regulation was proposed, the utilities found themselves without an organization to look after their interests; hence the Public Utility Association of West Virginia.

PRESIDENT MARKLE

Most of the properties being rather small, it was impossible to form a healthy organization without embracing almost all of the utilities of the State. The association hopes, however, to bring about some sort of contact with the National Electric Light Association.

Subjects of interest to the electric-lighting companies were brought up for discussion on the first day. The program included an informal discussion on the advisability of central-station companies doing wiring. This discussion was led by W. G. Mathews, president of the Virginia-Western Power Company, Clifton Forge, Va. Two papers were contributed by members of the Virginian Power Company of Charleston, W. Va., one by A. M. Rosenblatt on "High-Tension Distribution," and the other by R. A. Schott on "Diversity of Coal-Mining Load." The first described the high-tension distribution system of the Virginian Power Company, a description of which has already appeared in these columns.

#### Diversity of Coal-Mining Load

In this paper Mr. Schott called attention to the fact that the Virginian Power Company was the first large utility in the State to furnish electricity exclusively for coal-mining operation. During the past three years the company has made a study of the load factors and diversity factors of coal-mining loads as existing in the converter substations and transformer substations. Approximately 250 coal mines in the Kanawha and New River coal fields are supplied with electricity from the Virginian Power Company's circuits. During the past year the company has kept graphic records of the demands of more than 100 mines. It was found that the diversity factor of converter substations increases with the load factor and that diversity and load factors increase with the time element during which the integrated peak is measured. The diversity of operations relative to the load at the power plant decreases as the time element of the maximum integrated load increases. That is, if the company allows its customers a peak measured on a five-minute integrated load, the diversity will be about one to two between the demand of the different customers and the peak at the power house, while if the peak is measured on a fifteen-minute integrated load, there will be practically no diversity between the operations and the power house.

The basic load in every mining operation has no diversity. The fluctuating load depending on the output has a diversity of from two to three between the load and the converting apparatus. In large mines, therefore, the fan and pump load is detached from the converter substation and supplied directly from alternating-current transformers. In determining the size of the transformer substation it has been found good practice to add the rating in kilowatts of the converter substation and the rated horsepower of the motors for fans and pumps and use the sum of both without any diversity as the rating of the transformer substation in kva.

In shaft mines two types of electric hoist are employed, one connected to a motor directly fed from the line and the other from a flywheel motor-generator set. In the first case the load factor of the hoist will be about 30 per cent and the diversity from one to three; in the second case the load factor will be unity, and there will be no diversity factor. It follows, therefore, that in the first case a larger transformer substation is required than in the second case; but the same installation of transformers will be sufficient for two or three hoists in the first case. On the other hand, the rating of the transformers in the second case for a single hoist is only one-half that required in the first case; but if three hoists were used, 50 per cent more transformer capacity would be needed.

The author said it was difficult to establish any fixed rule in regard to the rating of converter transformer substations with reference to the connected load.

#### Efficiency of Transformer Distribution

The importance of efficient transformer distribution especially in the case of smaller companies was pointed out by W. R. Power, superintendent of the Consolidated Light, Heat & Power Company of Huntington. The distribution arrangements of smaller companies are usually very poor, and since many of the companies are now purchasing energy from large transmission companies it is essentially important that they give the matter close attention. According to the author, cases have been known where the unaccounted-for energy was over 40 per cent of the amount generated or purchased. It was suggested that by using large transformers and combining the customers on three-wire secondaries these losses can be materially reduced.

A method was outlined for using one transformer in the residence district and running secondaries 400 ft. or 500 ft. in each direction from the transformer. The diversity factor on resident business has been largely increased by the general use of the tungsten lamps, which has brought the connected load on residences to a much lower point than formerly. Citations were made from the 1914 Doherty Medal paper showing that the initial cost and total charge for a ten-year period for different

sizes of transformers were as follows: 1 kva., $5; 5 kva., $12.10 or $2.42 per kva.; 10 kva., $19.20 or $1.92 per kva.; 50 kva., $57.40 or $1.15 per kva. According to Mr. Powers, many small companies in West Virginia are still using individual transformers for each resident customer, and the losses incident to such an arrangement in his opinion can be corrected with profit to the company.

In addition to the above papers read at the opening session, a paper on "Maximum Demand Meters and Measurements" was contributed by C. A. Boddie of the Westinghouse Electric & Manufacturing Company.

The first session of the second day was taken up by a paper entitled "Rates and Rate of Return and Proportion for Municipal Service," contributed by C. B. Salmon of Beloit, Wis. The paper was made up for the most part of citations from famous court and commission decisions in rate cases, and it was the opinion of the author that in a State like West Virginia, where every effort is being made to induce manufacturers and capital to settle, a higher rate of return should be allowed than in the New England and Middle Atlantic States.

At the afternoon session two papers of interest to railway men were read, one, on the 1200-volt versus the 600-volt direct-current system, by S. B. Fortenbaugh of the General Electric Company, Schenectady, and the other, on concrete track construction, by J. F. Fagan of Huntington.

J. K. Anderson, chief engineer of the West Virginia Public Service Commission, addressed the meeting, suggesting that the electric-lighting companies adopt some uniform rules as part of the application blank for service.

The next meeting of the association will be held at Parkersburg in the spring. The officers of the new association are as follows: President, Herbert Markle, general manager Appalachian Power Company, Bluefield; first vice-president, G. O. Nagle, vice-president and general manager Wheeling Traction Company, Wheeling; second vice-president, Mentor Hetzer, general manager Moundsville Water Company, Moundsville; third vice-president, James Imboden, treasurer West Virginia Light & Traction Company, Charleston; secretary and treasurer, W. C. Davisson, vice-president and treasurer West Virginia Water & Electric Company, Charleston.

## CO-OPERATION DISCUSSED BY JOBBERS

### Campaign Between Pacific Gas & Electric Company and Dealers in California Cited as Worthy of Emulation in the East

The Electrical Supply Jobbers' Association at its meeting at Hot Springs, Va., last week adopted many suggestions recommended by its unit and standard-package committee and discussed the broad question of co-operation from various angles. At Thursday's session T. M. Debevoise, counsel of the association, spoke on the shortcomings of co-operation. That evening Ernest H. Gaunt of Babson's Statistical Organization spoke on "Co-operation: The Way Out for Business," and at the closing session on Friday E. W. Rockafellow, assistant general sales manager of the Western Electric Company, who recently returned from the Pacific Coast, addressed the meeting on the practical development of an important co-operative movement between the lighting companies and dealers of the Pacific Coast.

Mr. Rockafellow stated that this movement, as noted on page 1224 of this issue, if successful, will have a far-reaching effect on the marketing of energy-consuming devices and will go a great way toward bringing the central stations, dealers and contractors together as they should be. He urged the jobbers in all sections of the country to watch the campaign and be prepared to follow the example of the Pacific Coast members.

The suggestions to manufacturers recommended by the unit and standard-package committee had to do chiefly with the marking of standard packages, which would contribute greatly to convenience in handling and in the recognition of material in stock rooms and in shipments. Changes were also suggested in the method of packing. The incandescent-lamp situation was discussed as well as the fan-motor market. The association went on record as favoring a more convenient method of packing porcelain knobs and cleats. In order to permit rapid identification, the committee recommended that cartons be marked with illustrations of the contents, suitably described and packed.

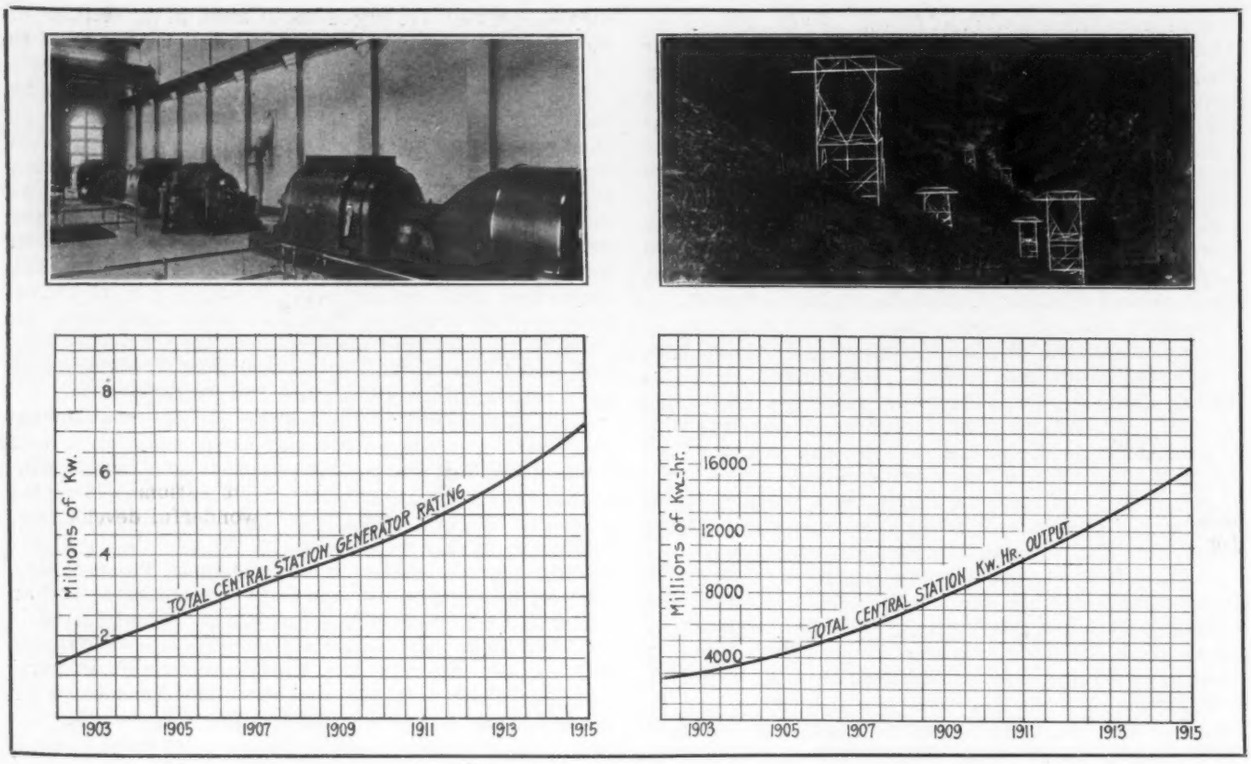
T. M. Debevoise, in his address on Thursday morning, said that about 95 per cent of co-operation is just plain talk. Real co-operation depends on absolute confidence among the co-operators, and this in turn connotes a common honesty of purpose and of execution. This, he said, could best be obtained by the adoption and carrying out of the golden rule of business, namely: Ask yourself how you would like to be treated by the other fellow and deal with him according to that standard.

At the Thursday session a resolution was introduced and adopted whereby the Electrical Supply Jobbers' Association will become a member of the American Fair Trade League and a supporter of the Stevens bill. Inasmuch as the jobbers will hereafter meet three times a year instead of quarterly, the by-laws of the association were modified accordingly.

At the evening session Mr. Gaunt showed by means of a chart that periods of prosperity and of depression followed each other in cycles. J. M. Wakeman, general manager of the Society for Electrical Development, followed and, referring to the curve shown by the previous speaker, said that when the wail of pessimism was everywhere and the depression curve had reached its lowest point the Society for Electrical Development injected a note of optimism and opportunity which was taken up by the press, business men and manufacturers everywhere and which will culminate in Electrical Prosperity Week. This, he said, shows what can be done by co-operative effort. Mr. Wakeman outlined the functions of the Society for Electrical Development, told of its staff and their work, what Electrical Prosperity Week means and what enormous preparations were being made to celebrate the event. This formed the subject of discussion between jobbers at Friday's session, and much enthusiasm over the campaign was evinced by the jobbers. The Stevens bill and its meaning to trade was the topic of an address by C. L. Miller of Lancaster, Pa., who spoke on Thursday night.

In addition to E. W. Rockafellow, F. N. Averill, a jobber of Portland, Ore., made an address on Friday morning on co-operation with contractors and central stations in that territory. Mr. Averill suggested a method for competing with hardware dealers and others in the sale of small electrical appliances. It was found in Portland that by reducing the price of a number of staple articles, such as lamp sockets, etc., to the price quoted by hardware dealers, it was possible not only to secure the business previously secured by hardware dealers but all the other business in electrical supplies.

A resolution was adopted at the final session whereby central-station managers will hereafter be invited to attend the meetings of the Electrical Supply Jobbers' Association. The next meeting of the association will be held next February in Detroit, and it is planned at that time to invite the managers of the central stations in Detroit, Cleveland, Toledo and the territory adjacent to Detroit to the sessions.




THESE PROGRESS CURVES ARE PRESENTED TO SHOW IN GENERAL THE WIDENING APPLICATION OF ELECTRICITY AS INDICATED BY THE INCREASE IN CENTRAL-STATION EQUIPMENT AND OUTPUT FROM 1903 TO 1915

# Interesting the "Non-Electrical" Public

ELECTRICITY has a news value to the non-electrical man. This article, based on a paper by Frank H. Gale, is presented for those men who come in contact with the non-electrical public, to help them in promoting the wider application of electricity. Electrical Prosperity Week, about to be celebrated, is but a nation-wide example of how this news factor in electricity may be put to work in the local community.

In considering the news value of electricity, let us first define news so that we may be exact, remembering that while all real news is based on facts, all facts are not news. Noah Webster said: "News is something strange or newly happened; a report of a recent event; information about something unknown; fresh tidings or recent intelligence."

It is important for all of us to know this, because, while electricity has value as news under all of these definitions, all too frequently the editor is asked to print articles which have no news value whatever.

The electrical industry is still a youngster. Every day it produces new wonders and, with the full vigor of youth, it accomplishes things which have few parallels in the industrial history of the world. Fortunate indeed is the writer who adopts this subject. Not only has he an unlimited field from which to draw interesting and timely material, but, even more important, he has a reading public anxiously waiting the product of his pen with a keen appetite for electrical stories and articles which has thus far been only stimulated, not satiated.

In discussing the news value of electricity, let us remember that we are not considering it from the standpoint of the writer of advertisements for paid space, but with special reference to its interest to the general reading public. Any attempt to trick the editor into publishing advertising as news must signally fail. Our attention is to be devoted to legitimate news only.

There are two kinds of news emanating from this great electrical industry. Research and development news is of the greatest interest to electrical engineers and perhaps to others actively engaged in electrical work. It might command attention from the scientific world, but not from the general public, which cares nothing about new methods for insulating armatures, new designs of rheostats, or new tests of a turbo-generator. The general reader is, however, eager to read about the discovery of a new lamp or a better electric railway, because he uses and understands these things.

The polyphase motor, for example, was a discovery of tremendous importance to the electrical industry, but it was of little news value to newspaper readers.

The designing engineer takes pardonable pride in the results of his efforts. He sometimes forgets, however, that his work is of real interest to a comparatively small number of readers, and that while of prime importance to him and his associates in the industry, it will not be considered news by the busy newspaper editor.

The editor is the censor of the publishing world. He decides what his readers shall read—by catering to what he knows they like to read. News must first appeal to the editor, then you can trust it to please the majority of the readers.

### What Is Acceptable as "News"?

"A hair divides the false and true," said a wise old Oriental many hundreds of years ago, and the sagacious editor has this phrase ever in mind when he edits the copy for his paper. If the proffered item rings true in news value, he passes it gladly, regardless of its source. If it lacks news value, out it goes, regardless of its source.

The discovery of the first incandescent lamp was news, because it revolutionized lighting.

A story about the proper way to install incandescent lamps is news, because it shows people how to use light without wasting it.

A story about the candle-power of an incandescent lamp is news, because it tells people something they do not know.

The story of how the electricity used in an incandescent lamp is measured is news, because it tells how the quantity of the current is determined. But the fact that John Jones carries a full line of trade-marked lamps is not news. It is plain advertising and should be paid for accordingly.

It is a well-known fact that anything Mr. Edison says or does is regarded as high in news value, regardless of the obvious fact that Mr. Edison and his business association must profit to a certain extent by such free publicity. This is because Edison's personality, as the greatest inventor of the age, carries enough news value to place a story about him in almost any newspaper or magazine.

While the value of paid advertising space is recognized in general, the tremendous importance of so-called "free publicity" in the news columns ranks so much higher as to become immediately the coveted object of the efforts of the wide-awake publicity manager. This, unfortunately, results many times in his overdoing the matter, as is exemplified by the rise and fall of the so-called press agent. From time to time we have seen public men who have created such a tremendous amount of news that, regardless of its obvious advertising value to them, the editors were glad to publish it. But this is quite different from the work of the press agent who attempts to secure free publicity for men, or industries, that inherently have little or nothing which can be considered as real news.

Who has not read of the actress' milk bath and the theft of the leading lady's "jewels"?

These jokes no longer interest the busy editor and quickly find their way to the waste basket. He keeps his editorial "specs" carefully polished and his "blue pencil" sharpened for just such items.

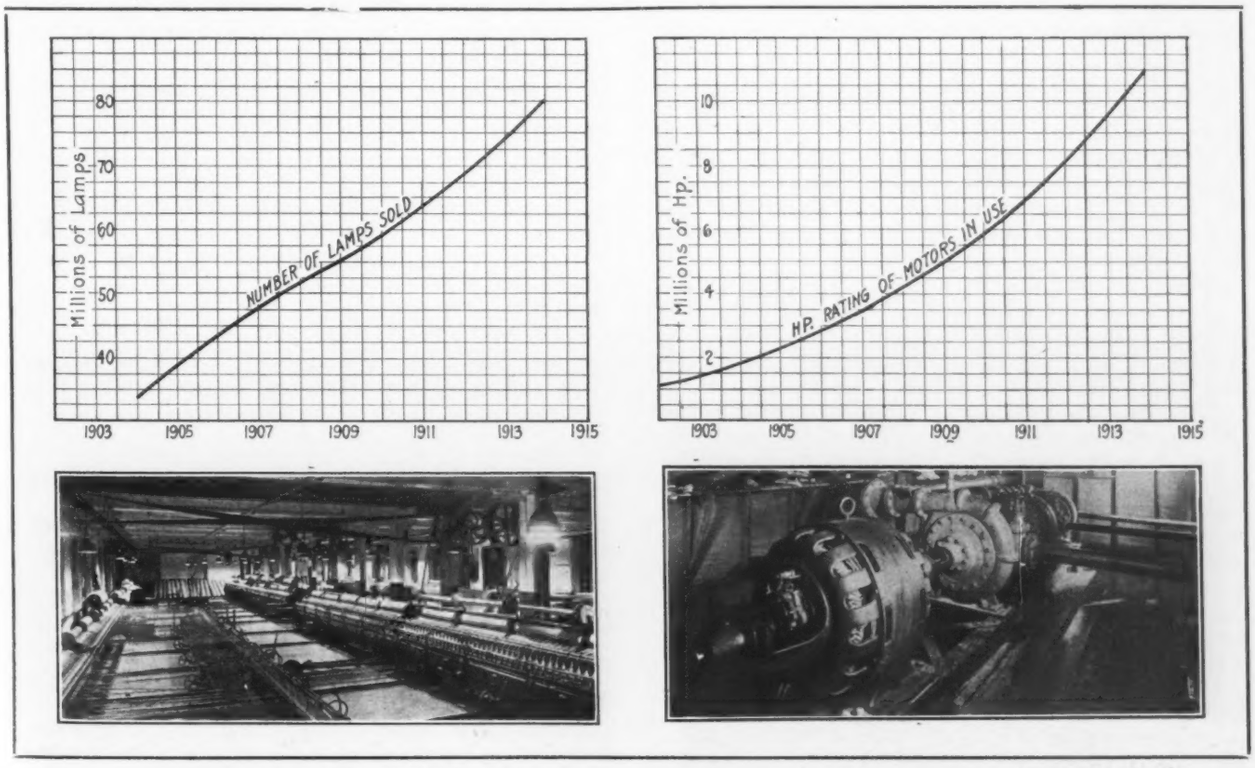
### Advertising Must Be Avoided

News must be kept free from advertising.

The writer on electrical subjects should hand his editor only legitimate stories, and surely there is so much in this great industry of ours which is of vital interest to all that one need never violate this rule and yet be able to furnish, from time to time, almost unlimited readable news material. News of national interest is to be found everywhere in the wonderful developments in the electrical field.

Newspaper readers take a keen interest in the improvements in local service in lighting and in the application of electricity to household needs. A public service corporation, by wisely publishing the news concerning its activities, can instill confidence and public pride in its institution, while a "say-nothing" policy keeps it actively on the defensive, and for want of other news the local reporters are driven to publish harmful items, or only the unfavorable side of any occurrence. Central-station managers long ago discovered that the best way to keep the good will of their customers is to explain frankly the cause of delays in service and show freely what they are doing to prevent them in the future.

Legitimate news travels fast. Some years ago, for example, when it was discovered that incandescent-lamp filaments could be made from the metal tungsten, the editors throughout the country were glad to publish




CURVES SHOWING INCREASE IN NUMBER OF ELECTRIC LAMPS AND MOTORS, 1903-1915

everything available regarding tungsten—where it came from, how it was used, the vast improvement which it made possible in electric lighting.

They cared not how much credit they gave to scientists or to companies who were responsible for this wonderful development, but when in the process of development commercial and engineering reasons demanded a specific name for these lamps, the difference between the news value of tungsten and the new trademark was quite apparent. Even though the new lamps represented a higher efficiency and gave better service than the tungsten-filament lamps previously described freely by publishers everywhere, the amount of publicity obtainable with the new name was practically nothing. Any effort to slip this trade name by the editor through press-agent subterfuges was bound to fail, and not until the new name has become a by-word in every household can the editor be expected to use it in his columns. The word "kodak," originally a trade name coined for a special product, has been so widely advertised and has been connected with such a high-grade product that it is now a recognized term which will properly pass almost any editor's desk.

### The News Value of the Electrical Industry

The publicity man should always have this perfectly proper attitude of the editor in his mind, but fortunate is the writer on electrical subjects in that he treats of an industry which has high news value in all its phases. No other industry has been able to secure for itself the exclusive use of one or more pages in daily newspapers several times a week, as has been done for some time in many of our cities where the electrical interests have co-operated to produce a so-called "people's electrical page." No other industry has been able to produce week after week sufficient items having real news value to warrant the publishers in frankly devoting a page to this subject. Perhaps I should except the automobile field. But even here we find the articles published to be much more of a trade character and of less general interest to the public. Naturally they can appeal to only that class of the public buying automobiles, while electricity with its many uses appeals to nearly every one.

The automobile news soon wore out its welcome. It ceased to be news, and now the automobile page has begun to disappear.

To the publicity man I would say, learn to discriminate between news for the electrical industry and news for the daily press. For want of a better way, try it out on your wife and family. If they are interested, the general public are sure to be.

In writing for the press be sure you have something to say of real news value and then put it in good, easy, flowing English. Tell it in a simple, comprehensive way and supply pictures whenever possible. In every case be clean and above-board in your methods.

Do not expect to see your name in print in every paragraph. This is the indelible stamp of the amateur press agent and is as deadly to a news story as paris green is to a potato bug.

A publicity man should be like a good hunting dog. It is not his business to make a killing. He is there to find and scare up the game and let the hunters do the shooting.

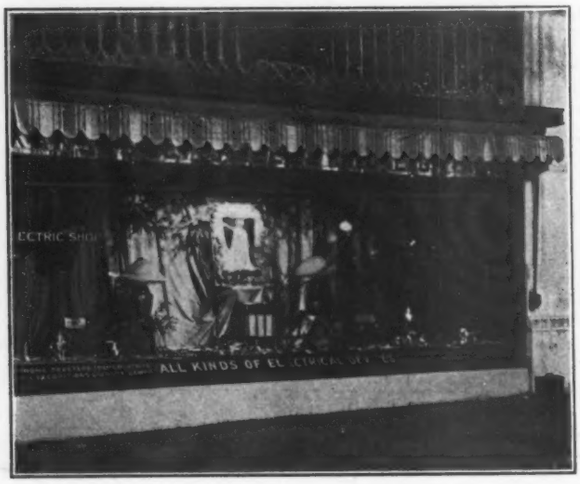
Publicity can do no more than educate the reading public and thus create a demand for electrical goods—or *goods electrical.* It is up to the salesmen to move the stock. This is also true, to a large extent, of paid advertising.

With a comparatively new industry like the electrical business it is all-important that the public be educated to understand the uses of electricity, so they can comprehend the trade words and terms. They must learn in some way of the great benefits of electric light—its safety and economy—else they will never abandon the older forms of illumination.

Many lighting companies find it profitable to issue publications of their own to the citizens of their community. These frequently contain news items of a high order, but, of course, they merely supplement similar news which the lighting company should always have available for the use of local editors.

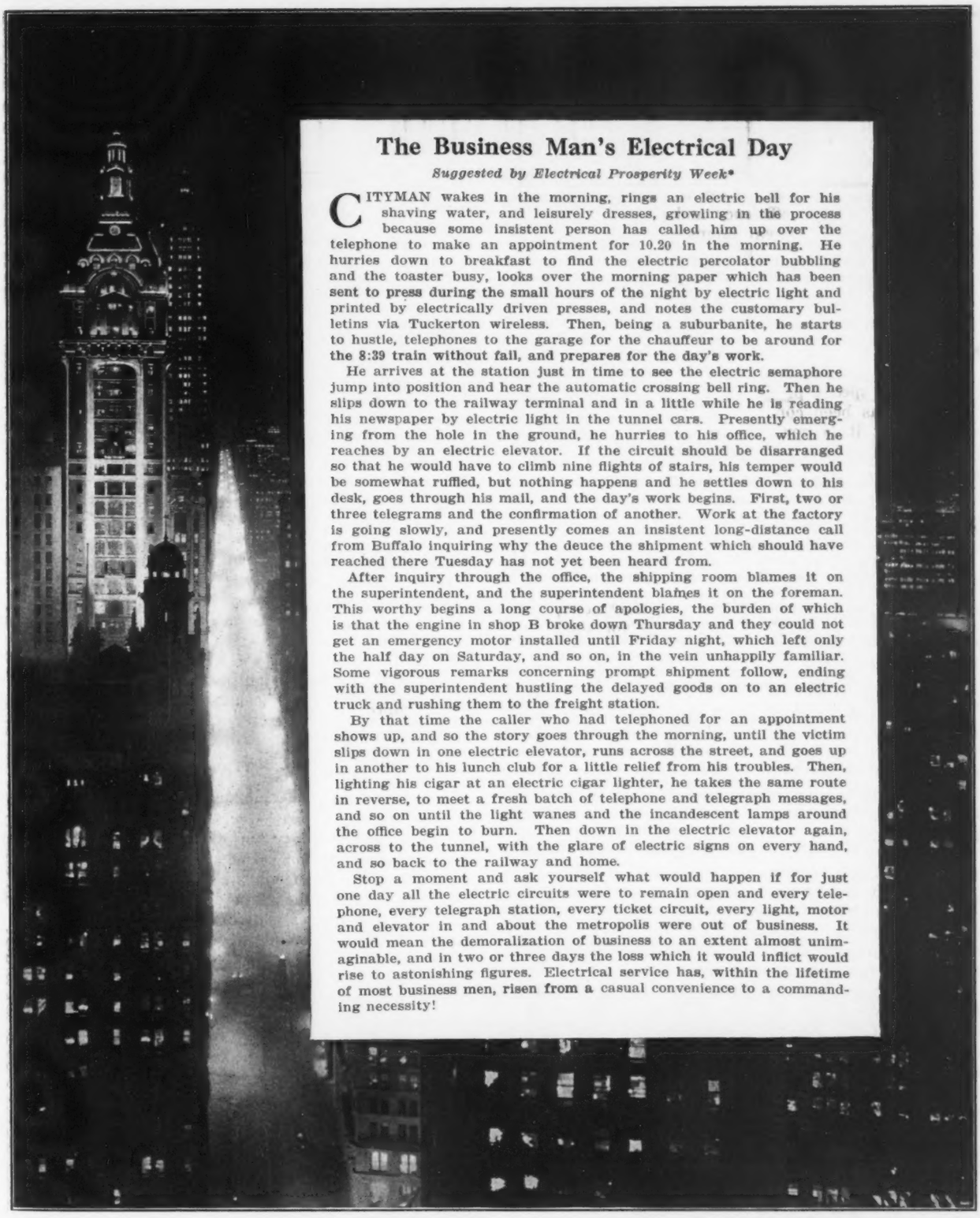
Be on good terms with reporters and editors. Drop in the newspaper offices now and then. Tip them off on good newsy stories when you can. This does not mean to peddle gossip, but every man is apt to see accidents, to note improvement, to hear of things which are real news. The editor will repay you a hundredfold when you hand him some news about your own industry.

It is a fact that well-known writers throughout the country are becoming more and more interested in electrical matters. The fiction of the day frequently refers to devices using electricity, even, upon occasion, using names more or less regarded as trademarks. From this I foresee a material increase within the next year or two of electrical terms in current literature. The manufacturer of electrical material and the central station manufacturing and selling electricity should use their influence to supply these writers with complete and truthful statements. Once their confidence is destroyed, the electrical industry will have lost a valuable ally. We should be just as careful to supply reliable information to "free-lance" writers as to the editors themselves.



## Kansas City Electrical Window Displays to Have Uniform Features During Prosperity Week

F. B. Uhrig, chairman of the general committee on Electrical Prosperity Week in Kansas City, Mo., has taken up with the Merchants' Association the subject of decorating windows electrically, and has received assurances of co-operation from members of the association. All will have special window displays, featuring electricity as far as their classes of goods permit. The Kansas City Electric Light Company has decorated its display window with the "model" design, and pictures of it are being distributed to all merchants, particularly to firms handling electrical goods and to contractors, so that there may be a uniformity in the appeal of the windows. It is expected that the display of this common electrical feature, whatever else is in the window, will attract attention and cause investigation.



## The Business Man's Electrical Day

*Suggested by Electrical Prosperity Week**

CITYMAN wakes in the morning, rings an electric bell for his shaving water, and leisurely dresses, growling in the process because some insistent person has called him up over the telephone to make an appointment for 10.20 in the morning. He hurries down to breakfast to find the electric percolator bubbling and the toaster busy, looks over the morning paper which has been sent to press during the small hours of the night by electric light and printed by electrically driven presses, and notes the customary bulletins via Tuckerton wireless. Then, being a suburbanite, he starts to hustle, telephones to the garage for the chauffeur to be around for the 8:39 train without fail, and prepares for the day's work.

He arrives at the station just in time to see the electric semaphore jump into position and hear the automatic crossing bell ring. Then he slips down to the railway terminal and in a little while he is reading his newspaper by electric light in the tunnel cars. Presently emerging from the hole in the ground, he hurries to his office, which he reaches by an electric elevator. If the circuit should be disarranged so that he would have to climb nine flights of stairs, his temper would be somewhat ruffled, but nothing happens and he settles down to his desk, goes through his mail, and the day's work begins. First, two or three telegrams and the confirmation of another. Work at the factory is going slowly, and presently comes an insistent long-distance call from Buffalo inquiring why the deuce the shipment which should have reached there Tuesday has not yet been heard from.

After inquiry through the office, the shipping room blames it on the superintendent, and the superintendent blames it on the foreman. This worthy begins a long course of apologies, the burden of which is that the engine in shop B broke down Thursday and they could not get an emergency motor installed until Friday night, which left only the half day on Saturday, and so on, in the vein unhappily familiar. Some vigorous remarks concerning prompt shipment follow, ending with the superintendent hustling the delayed goods on to an electric truck and rushing them to the freight station.

By that time the caller who had telephoned for an appointment shows up, and so the story goes through the morning, until the victim slips down in one electric elevator, runs across the street, and goes up in another to his lunch club for a little relief from his troubles. Then, lighting his cigar at an electric cigar lighter, he takes the same route in reverse, to meet a fresh batch of telephone and telegraph messages, and so on until the light wanes and the incandescent lamps around the office begin to burn. Then down in the electric elevator again, across to the tunnel, with the glare of electric signs on every hand, and so back to the railway and home.

Stop a moment and ask yourself what would happen if for just one day all the electric circuits were to remain open and every telephone, every telegraph station, every ticket circuit, every light, motor and elevator in and about the metropolis were out of business. It would mean the demoralization of business to an extent almost unimaginable, and in two or three days the loss which it would inflict would rise to astonishing figures. Electrical service has, within the lifetime of most business men, risen from a casual convenience to a commanding necessity!

AT first thought the Electrical Prosperity Week, which is now upon us, may seem to the average man a rather over-enthusiastic piece of boosting, an effort to boom business beyond its normal growth. The public has had so much of fervid advertising in the last few years that the inference in this case may perhaps be forgiven, for the average man does not in the least grasp the whole meaning of electrical developments in his daily life. If he did fully comprehend their significance, he would become aware that, instead of a mere claim for recognition, Electrical Prosperity Week is simply a systematic effort to make the people for a moment understand how much they are indebted to electricity for the effective working of civilization.

At every turn, look where we will, we are confronted by the marvelous things which electricity has done to promote human efficiency and convenience. From this point of view Electrical Prosperity Week ceases to be a mere effort at booming business and takes its place as a proper act of recognition for the profound influence of a mighty agent of human activity.

*Any central-station manager or dealer who sees a way to make use of this explanation of electricity in every-day life in connection with his local sales campaign is free to do so.

## PROSPERITY WEEK CELEBRATIONS

### Everything in Readiness for Great Sales Campaign Throughout the Country Next Week

Electrical Prosperity Week—Nov. 29 to Dec. 4—is at hand, and the plans that have been carefully made in hundreds of cities are about to be put into action. Former issues of the ELECTRICAL WORLD have told of the plans of different local committees as they have been developed. Electrical shows featuring displays of household devices, nightly parades of decorated and illuminated vehicles, essays on electricity in its many uses by children of the public schools, popular lectures on the advantages of electricity in the home and factory, dances and balls, and the crowning of the Goddess Electra, are but a few of the many different ways in which the six days will be celebrated by the electrical fraternity.

Late reports, showing what is being done by local committees, are at hand. Plans for the celebration in New York City have been worked out by the United Electric Light & Power Company in the uptown districts and some of the large manufacturers in the downtown district. Many of the large department stores will make special displays of electrical appliances during the week under the supervision of the Westinghouse Electric & Manufacturing Company. The thirty-four Riker-Hegeman drug stores in the city will put special Hotpoint and Edison lamp displays in their windows.

The Brooklyn (N. Y.) Edison company, in addition to an electrical show and a reduced-price house-wiring campaign, has contracted for either half or full pages of advertisements in all of the Brooklyn papers.

#### Boston's Preparations

In Boston the week will be well advertised by the cars. Every surface, subway and elevated car will have a dasher sign on front on which will be printed: "This is Electrical Prosperity Week. Shop early. Avoid Christmas rush." This is in addition to all of the other advertising which has been mentioned in previous issues.

Everything is ready for the parade which will inaugurate the Louisville celebration on Monday evening, Nov. 29, in which there will be at least forty floats, representing the telephone companies, manufacturers of electrical appliances, dealers, etc. The armory, the displays and the carnival will be the centers of the celebration during the remainder of the week.

In connection with their celebration of Electrical Prosperity Week the Jovians of Nashville, Tenn., will make use of the Nashville manufacturers' permanent exhibition. There is a movement on foot to make the week the opening of the "shop early" season.

Milwaukee, Wis., besides having an electrical show, will also give to each day of the week a special signification. Monday will be opening day, Tuesday housewives' day, Wednesday illumination day, Thursday Wisconsin day, Friday industrial day, and Saturday children's day.

#### Los Angeles Getting Ready

Mayor Sebastian of Los Angeles has indorsed the plans for the celebration proposed by the local committee and urged all citizens to assist in their execution. These plans include the special illumination of streets, buildings and stores, lectures on electrical topics, visits of children to power stations and telephone exchanges and their general co-operation in the event.

The electrical industries of Wichita, Kan., have prepared elaborate plans for the celebration of Electrical Prosperity Week. There are to be three parades, the first to be held Nov. 29 at night. The business men have entered into the spirit of the occasion and will compete in preparing specially illuminated and trimmed windows. Support has been given by the leading newspapers, and there will be a special edition published on Nov. 27.

It is also planned to have an illuminated balloon ascension. The Wichita Aero Club will use its new balloon "Wichita I," and it is hoped that this will be piloted by Captain E. H. Honeywell of St. Louis, if the weather conditions are satisfactory. This balloon is to be illuminated with colored lights arranged on the basket, and the bag proper is to be lighted up by electric searchlights.

The Wichita *Beacon* has also offered three prizes to be given to the women of the city writing the best articles on "Electric Appliances in the Home."

Plans for Electrical Week in Birmingham, Ala., have been completed, according to Frank Hammond, chairman of the local committee. Various electrical appliances are to be demonstrated to Birmingham people. A big electrical parade in which automobiles decorated with electric signs will take part will be staged during the week. From the tops of tall office buildings strings of electric lamps will be suspended.

Inspired by the plans of the Electric Light & Power Company in its observance of Electrical Prosperity Week, the Rockland (Mass.) Retail Merchants' Association has voted to bear one-half the expense of a band and to make special window decorations of an electrical nature. It is the intention of the electric light company to make Rockland the show town of this vicinity for the week. Conveyances will be provided to bring present and prospective patrons to the city to see the advances accomplished in the electric world in the past few years.

Plans for the first big electric show to be held in Syracuse, N. Y., have been perfected by the local Electrical Prosperity Week committee. Practically every electrical concern in the city, the central station, manufacturers, jobbers, contractors and retail dealers, will be represented at the show, co-operating in the nation-wide campaign.

Memphis, Tenn., has made all arrangements for its electrical show. For the women there will be given each afternoon a dainty tea, everything to be prepared on electric-cooking apparatus. Most of the displays will be of a purely educational nature.

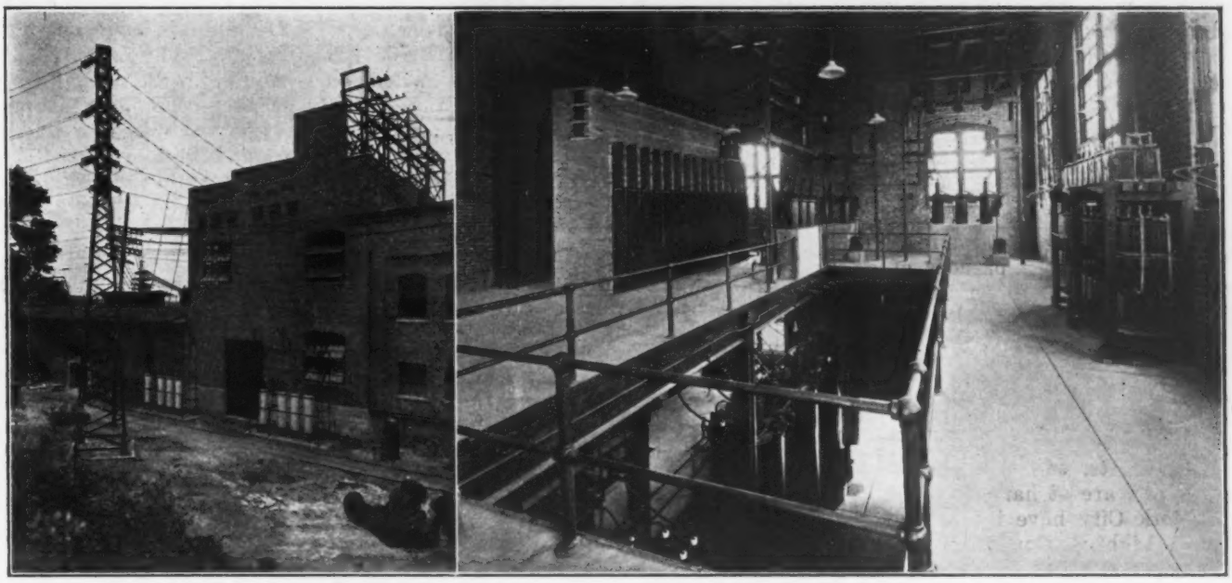
A model telephone exchange will be shown in actual operation, and special uses of electricity in the manufacture of Memphis-made goods will be demonstrated.

In order to celebrate Electrical Prosperity Week, the Philadelphia Electric Company has announced that it is prepared to install electrical fixtures in all ready-built stores and dwellings at a reduction of $1 per outlet during that time. According to the officials of the company, this proposition will net the consumer a saving of 20 per cent on the total cost of wiring.

#### Children to Take Part

Public school children of Cleveland and Dayton, Ohio, Spokane and Seattle, Wash., and many other places will compete during the week for prizes—some in money and others electric appliances—given for essays on some phase of the use of electricity. While almost every city that is planning to have any celebration at all will have one or more parades during the week, so many and varied are the different plans for celebration that it is impossible to enumerate all.

The Society for Electrical Development has been unable to fill orders for last-minute material, so great has been the demand on it. The society has now in preparation a booklet which is to recite the work done for Electrical Prosperity Week. Wishing to make the records complete, it asks that the chairmen of committees in charge of local celebrations send the society photographs, newspaper clippings and stories of the week.



INCOMING TRANSMISSION LINES AT AUGUSTA SUBSTATION AND ARRANGEMENT OF EQUIPMENT

# Georgia-Carolina Company Transmission System

## Line and River-Crossing Structures—Substation Layout and Equipment to Serve Augusta (Ga.) Distribution System and Small Outdoor Substations in South Carolina

IN last week's issue of the ELECTRICAL WORLD the layout of equipment and the construction of the Stevens Creek generating station of the Georgia-Carolina Power Company were described. As mentioned in that article, three-phase energy is transmitted at 44,000 volts to a substation in Augusta, a distance of 7 miles. The method of connecting the transformers in the generating station with the lightning-arrester equipment and two outgoing transmission circuits is shown in Fig. 1. The 44,000-volt busbars may be sectionalized so that the two transmission lines are independent of each other or they may be operated in parallel. The outgoing circuits pass through roof bushings, one at each end of the station but at different levels. They are connected outside the building with horn-gaps operated from within the station. Although the circuits are arranged in horizontal planes on the roof structures, they are so run to the two-circuit towers nearest the station that they may be supported thereon in vertical planes.

### Types of Transmission Towers Employed

The Stevens Creek-Augusta line consists of two circuits built over rolling country and along a canal. Over most of the route the line is supported on two-circuit wide-base towers, but inside Augusta city limits small-base towers are employed. Aerial ground wires earthed at every tower, assisted by electrolytic lightning arresters at each station, minimize the chance of interruption to service. Between the generating station and the Augusta substation the line crosses Lake Olmstead, the 900-ft. span being supported by special towers which are shown in Fig. 3. Views of the wide-base, small-base and river-crossing towers are shown in Figs. 2, 5 and 4 respectively. Telephone circuits are supported on the same structures as the line conductors. Data on the towers, conductors, insulators and ground wires are tabulated herewith.

The substation at Augusta is situated between an old 1500-kva. hydroelectric station and a new 2500-kva. steam station of the Augusta-Aiken Railway & Electric Corporation, abutting on both buildings, as shown in the headpiece. Around all four walls of the substation is a gallery on which are the 44,000-volt and 13,200-volt oil switch and bus structures and a control-circuit storage battery. As shown in the cut, the incoming transmission circuits pass through wall bushings at one end of this gallery and are connected with a loop-type, open-work sectionalized bus by choke coils, special disconnecting switches and line switches. These connections are illustrated in Fig. 7 and the layout is shown in Fig. 6. Aluminum-cell lightning arresters and horn-gaps are connected with the transmission lines outside the station. Space is provided around the edges of the gallery and on the main floor directly beneath for 44,000-volt switches and transformers respectively. Only one 6000-kva. bank of these instruments is needed so far, however. The method of connecting the switches and transformers by open-work busbars is shown in Fig. 8. The 13,200-volt terminals of the transformers

### STEVENS CREEK-AUGUSTA LINE (44,000 VOLTS)

STANDARD TOWERS.—Seventy two-circuit wide-base towers are employed, ranging in height from 65 ft. to 75 ft. and spaced 550 ft. apart with circuits arranged in vertical planes and conductors 6 ft. apart. Legs are 14 ft. apart and set 6 ft. in ground with concrete sleeve.

LAKE OLMSTEAD CROSSING.—Two 74-ft. A-frame structures placed 900 ft. apart support the wires in horizontal planes. Two wires of each circuit are in the upper group and one of each circuit in the lower group, with telephone circuits between.

SMALL-BASE TOWERS.—Twenty-two small-base latticed towers placed 175 ft. apart and ranging in height from 55 ft. to 65 ft. carry two circuits in vertical planes. Bases are bolted to 3-ton concrete foundations.

LINE CONDUCTORS.—Except on the Lake Olmstead crossing, where No. 00 conductors are used, the circuits consist of No. 0 nineteen-strand medium-hard-drawn copper cable.

AERIAL GROUND WIRE.—Stranded copper-clad wire 5/16 in. in diameter is attached to tops of towers at each support.

TELEPHONE CIRCUITS.—Three No. 10 stranded copper-clad telephone wires are supported inside frame of standard towers and to lower cross-arm of lake crossing.

STANDARD INSULATORS.—Three-disk R. Thomas & Sons No. 1118 disk-type suspension insulators are used.

ANGLE AND ANCHOR.—Four-disk insulators of same type.

connect with insulated cables which pass through conduit up through the gallery floor to the 13,200-volt busbars and switches. The 13,200-volt bus supplies energy to outlying districts of Augusta and to railway substations at Clearwater and Aiken, S. C.

To provide a two-phase, 2300-volt system for the distribution of energy in the city of Augusta two 1000-kva., 13,800/2300-volt transformers are T-connected and fed from the 13,200-volt substation bus. These units are supplemented by four 500-kva. T-connected transformer sets, thus making 4000 kva. available for feeding the city's distribution system. The 2300-volt bus and switch structure is situated on a slightly raised floor back of the main transformers.

All of the transformers in the substation are water-cooled. When operating at full load the three 2000-kva. transformers require 8½ gal. of water per minute, the two 1000-kva. transformers require 5 gal. of water per minute, and the 500-kva. units require 3¾ gal. a minute. As river water containing much silt is used for this purpose, a cooling pond, spray nozzles, filtering equipment and circulating apparatus are employed. Each transformer is equipped with a thermometer alarm to indicate when its temperature has exceeded a safe operating value.

All oil switches are electrically operated by master switches on a switchboard in the steam generating station adjoining, so that the apparatus in both the substation and generating station is under the control of one operator.

All 44,000-volt oil switches are General Electric triple-pole, single-throw, type K-21, and are equipped with bushing-type current transformers. The incoming and outgoing line switches are equipped with inverse time-limit relays, the switches on the incoming line being rated at 400 amp. and those on the outgoing line at 150 amp. The main-transformer high-tension switches are also rated at 150 amp., but are equipped with differential relays to prevent internal trouble. The 13,200-volt feeders and transformer circuits are controlled by 300-amp. General Electric single-pole, single-throw K-12 solenoid-operated switches. Single-pole type K-5 solenoid-operated switches, rated at 500 amp., are connected with the 2300-volt terminals of the 500-kva. transformers.

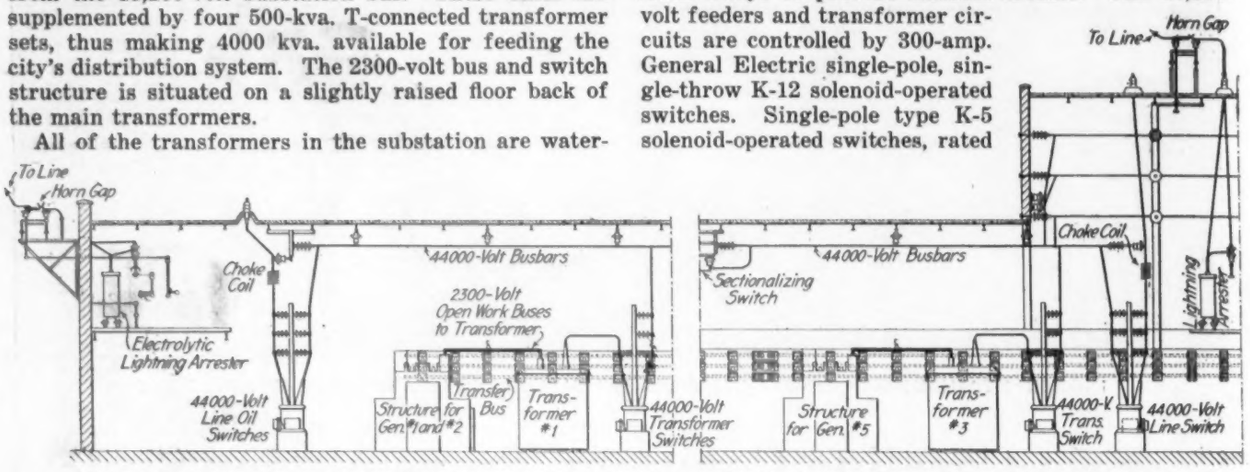
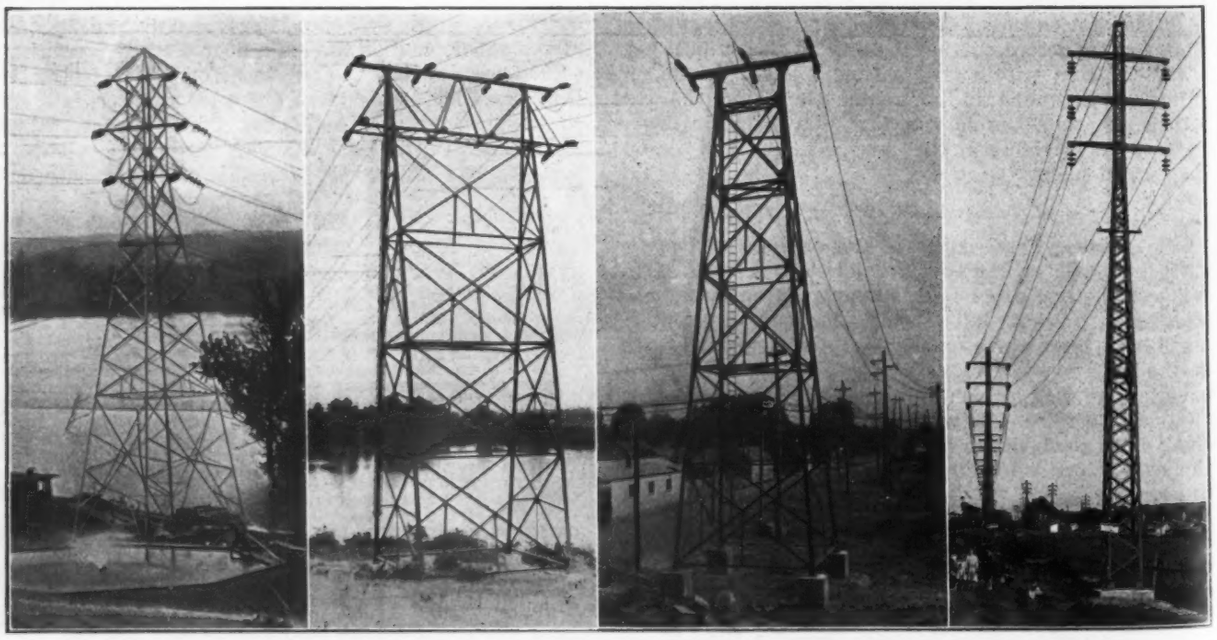



FIG. 1—METHOD OF CONNECTING TRANSMISSION LINES WITH GENERATING-STATION EQUIPMENT

### Type of Switches Employed

The special disconnecting switches previously mentioned and shown in the drawings are a development of the J. G. White Engineering Corporation to save floor space. For three-phase circuits they consist of three movable vertical rods with knife-blade ends which can be brought into contact with stationary jaws by raising the rods. The latter are rigidly attached to a frame by post-type insulators which can be moved simultaneously by a gear-operated mechanism.

As indicated in Figs. 6 and 7, the 44,000-volt busbars are connected with the transmission line extending along Horse Creek Valley to outdoor substations near Clear-



FIGS. 2, 3, 4 AND 5—STANDARD LAKE-CROSSING, RIVER-CROSSING AND SMALL-BASE TOWERS

water and Aiken, S. C. This line will supplement a 13,000-volt line connecting these substations, thereby minimizing the possibility of interruptions to service. The line is supported on single-circuit towers, small-base steel towers being used from the Augusta sub-

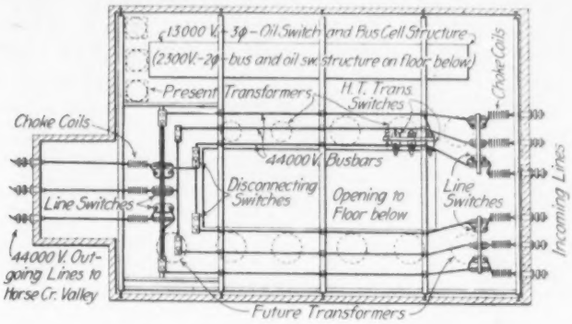



FIG. 6—LAYOUT OF AUGUSTA SUBSTATION EQUIPMENT

station to the Savannah River, where special steel towers are required because of the 1200-ft. span and clearance prescribed by the United States government over navigable streams. One of these towers is illustrated in Fig. 4. From the river-crossing tower the line is carried on chestnut poles, equipped with steel-wishbone cross-arms. Except across the Savannah River, where the conductors are arranged in a horizontal plane, they are spaced at the apexes of a triangle. Throughout the length of the line is a copper-clad aerial ground wire supported on insulators at the top of the poles and grounded at every fourth one. The lead to ground is No. 6 soft-drawn solid copper wire, and is coiled in the ground under the pole base. A sectionalizing switch is provided between the Clearwater substation and the Aiken substation so that the line can be sectionalized in case of trouble.

The outdoor substations at Clearwater and Aiken, S. C., are equipped to step down the voltage from 44,000 volts to 13,200 volts, and they feed 13,000-volt apparatus which is installed inside railway substations. Three 750-kva. transformers are installed at each substation and are provided with corrugated cases painted with white aluminum paint to assist radiation and prevent absorption of the sun's rays. The 44,000-volt and 13,200-volt busbars for the transformers are strung

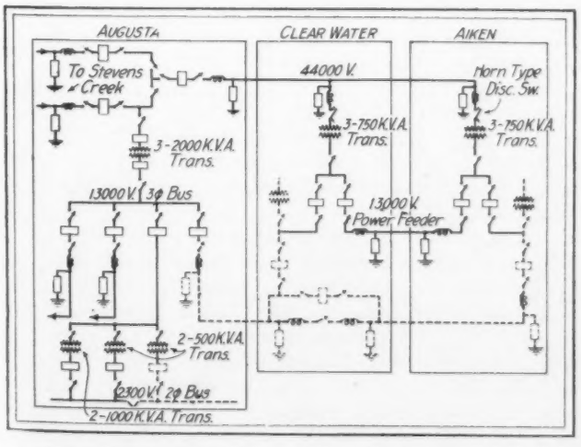



FIG. 7—METHOD OF CONNECTING SWITCHES AND TRANSFORMERS IN SUBSTATIONS

between two frames, each consisting of two poles with cross-arms between. Burke disconnecting switches and choke coils are installed at the top of other structures near the transformers, and mechanism is provided for operating the switches from the ground. Electrolytic lightning arresters are attached to the incoming 44,000-

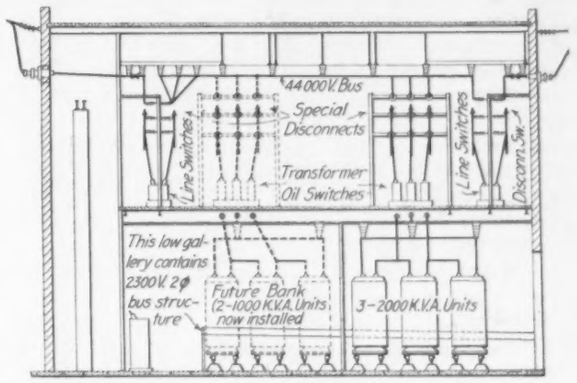



FIG. 8—BUS, SWITCH AND TRANSFORMER ARRANGEMENTS

volt lines. The new 13,000-volt feeder between the two railway substations, which will serve cotton-mill loads

## AUGUSTA-AIKEN LINE (44,000 VOLTS)

SMALL-BASE TOWERS.—Latticed towers ranging in height from 45 ft. to 60 ft. support single-circuit line inside Augusta limits so that conductors lie at apexes of triangle. The vertical distance between two arms is 5 ft. 6 in.

SAVANNAH RIVER CROSSING.—A-frame towers 75 ft. in height are placed on each side of river 1200 ft. apart and support a single circuit in a horizontal plane, giving a 75-ft. clearance above minimum low water.

CHESTNUT POLES.—From Savannah River to Aiken the line is carried on chestnut poles equipped with steel wishbone cross-arms, giving a spacing of 5 ft. 6 in., 7 ft. 6 in. and 9 ft. 4 in. between conductors.

CONDUCTORS.—No. 2 seven-strand medium hard-drawn copper is employed, except on Savannah River crossing, where 9/16-in. nineteen-strand copper-clad steel wire is employed. The sag on this crossing is adjusted by turnbuckles attached to the cross-arms by two-unit strain insulators.

AERIAL GROUND WIRE.—Cable of three No. 10 stranded copper-clad wires is attached to tops of poles and towers. Along wood-pole line it is grounded about every 600 ft. by No. 6 soft-drawn copper coiled in ground at base of pole.

TELEPHONE CIRCUIT.—No. 10 copper-clad telephone wire is used.

RIVER-CROSSING INSULATORS.—Two-unit Ohio Brass strain insulators similar to No. 10,750.

STRAIN INSULATORS.—Four No. 1118 R. Thomas & Son's disk-type insulators are used in series.

SUSPENSION INSULATORS.—Three No. 1118 R. Thomas & Son's disk-type insulators are connected in series.

along the route, is run along a route which will warrant connecting the maximum load. The 44,000-volt line, however, runs along the shortest route.

The entire system of the Georgia-Carolina Power

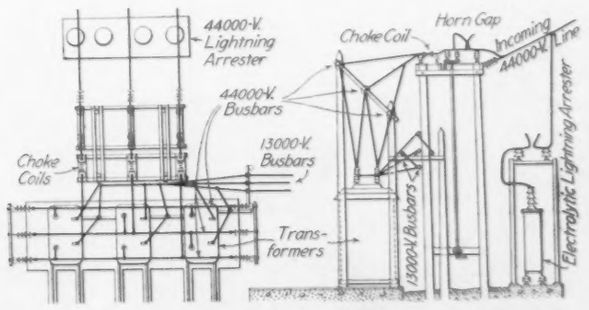
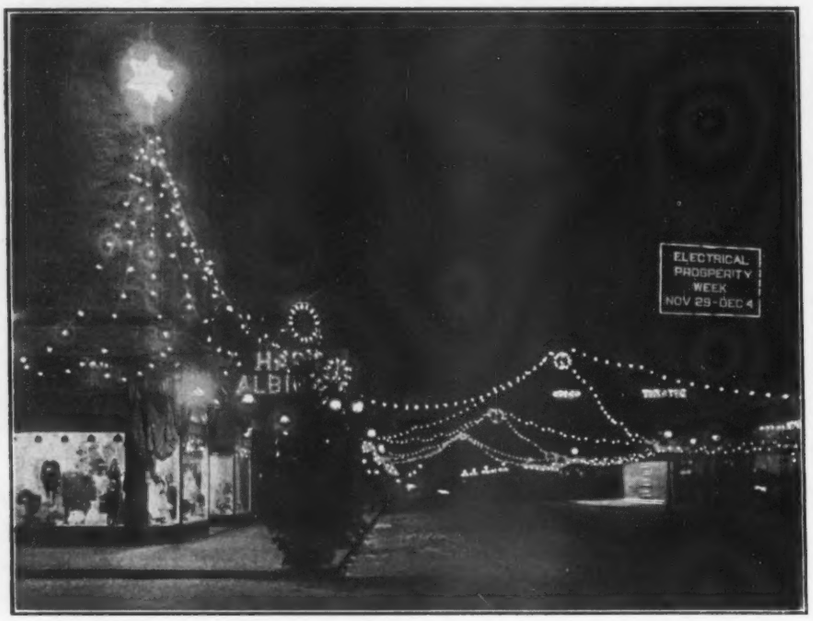



FIG. 9—ARRANGEMENT OF 2250-KVA. OUTDOOR SUBSTATION EQUIPMENT

Company was designed and constructed by the J. G. White Engineering Corporation, New York City, and is managed by the J. G. White Management Corporation.




Habit does not send the Christmas shopper to the electric shop. Many do not yet know that electric Christmas gifts are practical in price. You must tell them.

Decorate your building; mark the street before it with the emblems of the season. Put up outline lighting, streamers and festoons of red, green and white lights, and a Merry Christmas sign. Feature the Christmas colors and the Christmas bell in all your decorations. Put some sparkle into it. Make it individual. For the purpose is to lure the shopper from afar.

The display should be installed and lighted early, before the average merchant has dressed up his store. It will stand out more impressively and inspire the other merchants to more extensive lighting.

Take immediate steps to provide a number of public Christmas trees in the parks and squares. Enlist co-operation from city officials, newspapers, churches and societies. Trim the trees with electric lamps, the central station to donate the energy.

Install a handsome tree on the sidewalk before your store in all the sparkle you can put upon it. Feature another tree inside the store, bedecked with all the traditional finery, and make it attract the children and their parents to the store.

Offer Christmas-tree lighting to all the churches for their Sunday-schools. Request the ministers to announce the innovation two weeks before Christmas.

# Starting Christmas Sales with Prosperity Week

THERE is one important thought that comes this year with force unknown before, that the Christmas campaign this time need not —must not—be a simple, short-lived period of sales acceleration. Beginning with Electrical Prosperity Week, the industry will carry the strong impulse of its message through the weeks of Christmas shopping, with a spirit and a recognition that establish a new, high standard of achievement. This position must be maintained. The prominence that will be won for all the household applications of electric service, in the keen-edged competition of the Christmas market, is a trade asset of value beyond calculation, and the pressure of publicity and selling effort must not be allowed to die away. Prosperity Week will set the pace, the Christmas harvest follows, and beyond that comes the full new year, with constantly increasing opportunity.

It is essential to success in Christmas selling that the merchant shall appreciate that Christmas is after all a state of mind. For, aside from its religious and traditional significance, this Christmas is an institution with us that embraces the buying of many gifts in a spirit of merrymaking, and it is the merchant who makes capital of this emotional factor who profits best. The merchant who accentuates most effectually the true Christmas application of his goods and who displays them in a stimulating atmosphere of Christmas festivity is the one who attracts the biggest crowd of shoppers and influences the most generous spending. So we see each year among the big stores a lavish competition in display, and it is against such organized experience and ability that the young electric shop must measure wits.

### Visualize Your Market

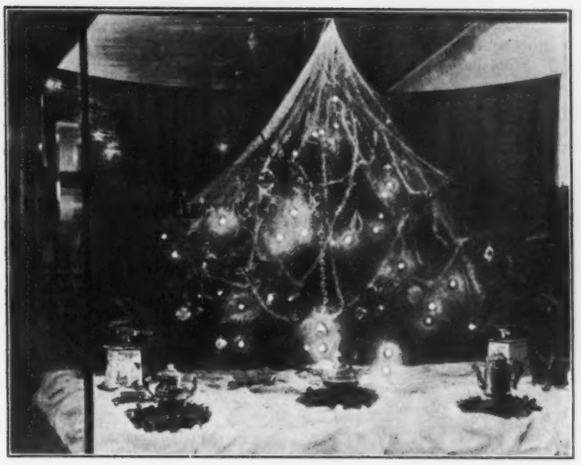
Consider the Christmas shopper as she comes down town to buy more gifts, for after all that is the way to visualize your market. She is hungry for appropriate suggestions. She is searching for just such gifts as you can sell her. She follows the prompting of such advertising as has been impressed upon her, but still her eyes are open eagerly for what the windows tell her. And so the store that is bedecked with Christmas gayety and resplendent with the promise of the things she seeks—in other words, the store that is plainly marked with the Christmas purpose—is the store that wins her interest and her money.

Of course, the central station and the dealer cannot compete with the department store in volume or diversity of display. It is not necessary. For the electric store is fortunate in selling goods of peculiar fitness for Christmas giving, of great appeal for their modernness and novelty. It is only necessary to make this known to all the shopping public, and the way to bid for Christmas business is to enter the field in the accepted way, to create the Christmas atmosphere, and to make the tired shopper feel that surely here she will find the kind of gifts she seeks.

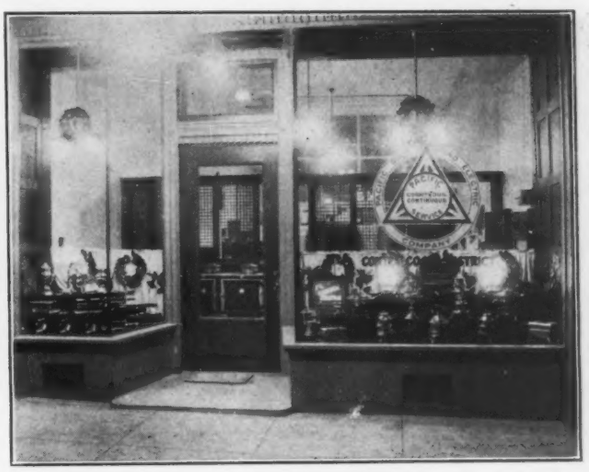
What can the central station and dealer do? Many things, and never before has the opportunity been so promising as it is this year, on the heels of the great Electrical Prosperity Week campaign. Here are some definite suggestions that have been proved profitable by many companies in former years:

### Definite Things to Do

1. The first and most urgent necessity is that your store look "Christmasy" inside and out. Your own



IN DRESSING THE CHRISTMAS WINDOW, SIGHT MUST NOT BE LOST OF THE PRIMARY PURPOSE—TO SELL GOODS



GROUPS OF TWO TO SIX GIFT APPLIANCES MAY BE OFFERED AT BARGAIN PRICES FOR THE THRIFTY PURCHASER

ideas and those suggested by past performances by department stores are the best guide as to what to do. Outline your building with red and white and green electric lights. Put up a "Merry Christmas" sign. Be generous with outdoor decorations that will mark your store—as far as the eye can reach—as a center of Christmas activity and suggestion. In the window of the store itself make lavish use of Christmas bells and Christmas streamers, holly, mistletoe and trees. Work hard to outdo every other local store in the appealing festive gayety of your establishment.

2. Plan ahead a series of good Christmas windows. You have seen a hundred good ones. The manufacturers are all suggesting just as appropriate displays for featuring their goods. Put the Christmas note in every window, but remember that the purpose is to sell the goods and do not let the merchandise become too secondary an impression.

3. Dress your goods for Christmas by the use of holly boxes and holly wrapping paper and tie them with holly tape. Use plenty of good Christmas price cards and announcement posters, in green and red, that carry out the Christmas idea, with holly in constant evidence. Much can be done with cards and posters, both in the store and windows, to keep the speed and spirit of your message.

4. Consider the fact that with many of your prospective customers electrical Christmas gifts are strong in novelty. It is well to have a Christmas opening in the store for which personal invitations can be sent to all your customers, with a cordial invitation extended to the public from your general advertising. At this reception give a buttonhole sprig of holly to every man and woman. Pick the most attractive girl among your employees and have her present sprigs of holly to the men guests, putting them into their buttonholes. Have one of your young men make the presentation to the ladies. Have an orchestra on hand to play good Christmas music and lively popular airs that will keep up the spirits of the crowd.

5. Schedule a series of special demonstrations every other day throughout the Christmas shopping weeks and advertise each one of them in the newspapers on both the preceding day and the day of the demonstration. Take the grill, for instance, and demonstrate it —employing several grills and showing all the different uses to which it can be used. Around about the demonstration space have gift grills, tied with ribbon, stacked up in holly boxes ready for delivery.

6. There is no reason why in a great many cases a group of gift appliances cannot be sold quite as easily as a single device. A group offer can be made whereby

Your store must look like Christmas. Be generous in the use of holly, mistletoe and Christmas bells—every dollar spent this way pays big dividends.

Display your goods in holly boxes. Wrap all purchases in holly paper. Tie the parcels with attractive Christmas tape. Use lots of decorated price tags and information cards.

Do everything you can to make it easy for your customers to buy. Have gift appliances ready wrapped in Christmas packages, with all price tags removed, so that there is no need to wait.

Accommodate the customer in other ways. Take orders for Christmas Eve deliveries. Make a future-payment proposition. Offer gift appliances in groups at special combination prices.

Feature a "Christmas opening" in your store and issue invitations. Schedule special demonstrations of appliances throughout each week, and advertise them widely.

Advertise the fact that all the churches have adopted electric lighting for their trees for safety. Tell about fires from Christmas trees in past years and make a stiff campaign for tree lamps about one week before the day.

COURTESY N. Y. ED. CO.

EACH YEAR THE ELECTRIC CHRISTMAS TREE IN MADISON SQUARE, NEW YORK, BRINGS HOLIDAY CHEER TO THOUSANDS

the shopper may purchase from two to six devices at a special group price which will offer a bargain and at the same time make it possible to cross off several names on the shopping list instead of one.

7. Offer to make Christmas Eve delivery of any purchase, inclosing the purchaser's card, to relieve the customer of the necessity of taking the appliance home and shipping it out again.

8. Make an offer of deferred payments on all Christmas gifts sold to regular customers, for which the bills will be sent out immediately, but payable, say, on Jan. 15. In many cases this will mean the sale of appliances when otherwise the shopper would not feel able to spend the amount of money necessary to buy so desirable a gift.

9. Advertise some prize Christmas gift and secure the name of each Christmas customer so that the prize may be awarded in some suitable manner.

10. Check over this record of the Christmas customers who have visited your store, compare it with your ledger, and get in touch over the telephone with good "prospects" who have not yet put in an appearance. Offer to send them one or two appliances on approval as gift suggestions, to be called for the next day, on notification, if they are not desired.

11. Make a public offer through your advertising that any electric gift appliance received at Christmas time which happens to be a duplicate of an appliance already in use in the home may be brought back to the electric shop and exchanged at its full value.

12. Make a confidential canvass of men, calling on them in their offices and suggesting that an electric range or a suction sweeper or a group of table cookery devices would be an appropriate gift for a wife or married daughter. It will come as a welcome suggestion in many cases and offer a happy solution to an irksome problem. Delivery can be made on Christmas Eve. "Prospects" for housewiring can be visited in this way and impressed with the fact that the best paternal Christmas gift for the unwired home is to install electric service for the comfort of the entire family.

13. Get in touch with the city officials, churches and societies and arrange for outdoor Christmas trees in parks. This is now being done successfully each year in many cities, and it provides a most appropriate public Christmas celebration, demonstrating conspicuously the use of electric lights on Christmas trees.

14. Offer Christmas lighting outfits to all the churches for their Sunday-school trees, requesting, however, that it be announced previous to Christmas that this donation has been made, with a word about the safety and appropriateness of electric tree lights. Coincidently with this, advertise past Christmas-tree fires and make a strong drive for the sale of tree-lighting outfits to the homes. It will be found that the loaning of the lights to the churches will induce many sales.

15. Naturally it is important to send out all the good Christmas advertising that can be obtained and justified. Gift suggestion booklets embodying shopping lists are most appropriate and convenient. Newspaper advertising should be changed constantly and tied closely to the daily doings in the store. Every possible means should be taken to impress the public with the fact that the electric store is vitally interested in the Christmas market and offers a wide variety of novel and particularly suitable gift suggestions.

### Utilize All Good Experience

Perhaps you have done most of these things before. What of it? Go ask the head of the department store how many new ideas for Christmas selling he averages each year, and you will find that with all his diverse lines there are few ways to make one Christmas different from the last.

The fact that you have just bedecked your store, your windows and your sign for Electrical Prosperity Week does not discount the effectiveness of different displays for the week of Christmas. The big stores have a dozen similar sales celebrations every year, and though the goods remain not different to any great degree, they interest us no less. The same shop window by its constantly changing message becomes a source of continuous interest to us, and we habitually watch and enjoy it.

The schemes of selling that worked well last year will prove no less productive if repeated with some slight change in their presentation. Therefore, take advantage of all the good experience you have gained in former holiday campaigns and utilize as far as possible the good ideas that have been originated by other central-station men. For you must fix your mind on the fact that the Christmas shopper comes downtown to buy and that she visits the store that makes its invitation strongest.

So it behooves the electrical merchant to make his store appealing in its holiday spirit, in its Christmas atmosphere. He must overlook no artifice of selling that will help impress upon the shopper that his store is rich in practical suggestions for inexpensive and appropriate gifts—gifts of comfort—that beyond all others typify the sentiment of this great universal holiday.

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## Who Shall Authorize Donations for Charity?

When solicitors for donations to charitable organizations are asked by the attendant at the central-station information desk to call at the office of the president of the company, the size of the expected contribution immediately assumes presidential proportions. If, however, some less imposing member of the company's staff is designated as the man who authorizes donations, the estimated revenue available shrinks accordingly in the mind of the solicitor. Chiefly for this reason, an Indiana company has taken the duty of authorizing donations from the president and placed it solely in the hands of the sales manager. Experience has shown that this change in practice has saved expense.

# Marketing Electricity

*A Department on Selling Service and Widening the Use of Electrical Energy*

## Topeka House-Wiring Campaign Shows Immediate Profit

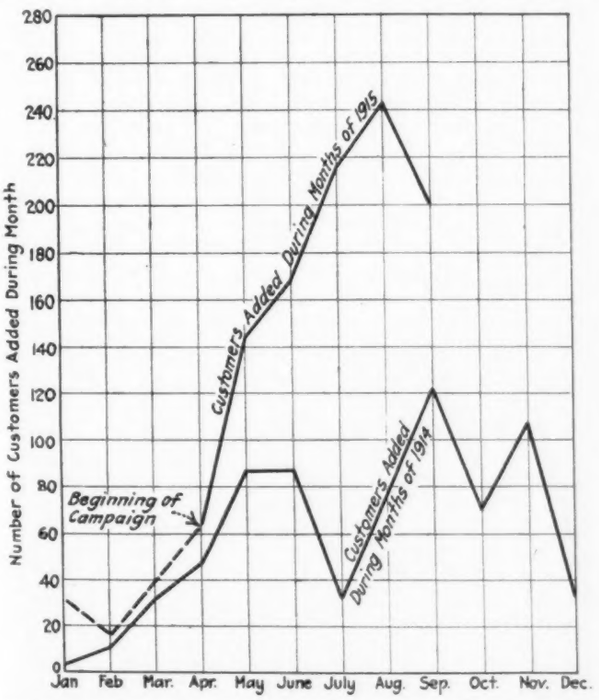
### How the Topeka Edison Company Has Made a Substantial Gain in Its Residence Load Through Co-operation with Local Contractors in Maintaining Wiring Prices

THE Topeka Edison Company of Topeka, Kan., has made its new-business department a financial asset to the company. It has paid liberal salaries and commissions to the solicitors and maintained prices to show an average profit of 28 cents on every house wired, and still, without any cut-price inducement or financial sacrifice, has been able to wire 950 old houses in six months. This has been accomplished in competition with 25-cent natural gas in a town supplied with electricity for thirty years, and by a man who was an absolute stranger in the city. The success of the work cannot be attributed, therefore, to the novelty of the service, power of wide acquaintance, or lack of competition. It was just plain work and system, and here is the system.

As a beginning Robert Burns Basham, in charge of new-business campaigns for the Illinois Traction System, entered into an agreement with the seven leading electrical contractors of the city upon a schedule of wiring which is shown herewith. The schedule submitted by the contractors was voluntarily raised by the company, beyond the prices originally asked by the contractors, to a figure at which the latter could make a fair margin of profit. This established the lighting company with the contractors as going in for fair play, and the co-operative spirit prevailing between company and contractors has been an important factor in the success of the campaign.

Contrary to the usual campaign, no special low-wiring price was made as the inducement. The usual time basis of payment was allowed, but this was limited to six months in 90 per cent of the cases and to seven to twelve months in the other 10 per cent. Very decided care was exercised against taking on any bad accounts, and out of 900 only six were found to be bad. No orders were taken except from property owners, but if a renter desired electric light and the owner would not wire for him, the company made efforts to find another house which was wired and otherwise suitable to the tenant, who then usually moved. In a number of cases the first landlord involved saw his mistake and had his house wired to facilitate re-renting it. This has worked out so well that a rental list is maintained in the new-business department which serves two purposes. It tends to keep the tenants in electrified houses, and it offers a tangible consideration to induce arbitrary owners to wire their houses.

Mr. Basham's band of solicitors, known on the Mc-




CURVES SHOWING COMPARATIVE NUMBER OF HOUSES WIRED IN TOPEKA, KAN., DURING THE MONTHS OF 1914 AND DURING THE CAMPAIGN OF 1915

THE TOPEKA COMPANY UTILIZES ALL AVAILABLE SPACE ON ITS LETTER PAPER AND ENVELOPES TO TELL THE COMMERCIAL STORY OF ELECTRICITY

CURRENT TOPICS

A LIVE WIRE PUBLICATION DEVOTED TO BRIGHTER HOMES

VOL. 1. September 4, 1915. NO. 22

**OVER 50 HOUSES WIRED FOR LIGHTS PAST FEW DAYS**

Get ready for the family's winter reading by installing electricity in your home. A good way to keep the children at home at night contented is to provide them good books to read and good lights to read by.

Make your home safe from burglars with electric lights. They never hang around houses that are electrified.

Your house can be wired regardless of when it was built. Modern wirers overcome all obstacles with ease.

Twenty-eight [illegible]

**CONSULT OUR LIST OF ELECTRIFIED HOUSES FOR RENT**

As a rule, houses wired for electricity are occupied, but in the whirligig of moving time they are occasionally vacated.

Moving time of the year is approaching. If you are going to move, move into an electrified house.

The Edison Company, for the accommodation of its patrons and the friends of electricity, will keep a list at its offices at 804 Kansas avenue, of vacant houses in Topeka that are wired for electricity and ready for [illegible]

Apply [illegible]

**61 ELECTRIC IRONS BOUGHT BY TOPEKA WOMEN PAST WEEK**

Sixty-one Electric Irons were bought by Topeka women in one week. That's the largest week's sale of 1915. It is the result of the Edison Company's direct home demonstration of electrical conveniences and the growing popularity of the electric iron—the greatest electrical convenience you can [illegible]

THIS BREEZY SECTION IN THE LOCAL PAPERS HAS PROVED ITSELF VALUABLE ELECTRICAL ADVERTISING

Kinley properties as the "flying squadron," is a group of carefully picked and experienced men. A certain territory is assigned to each man, and he is held responsible for the work in this section. He is obliged to settle every dispute relative to wiring jobs in his section—a plan which eliminates the salesman making promises which cannot be fulfilled, or otherwise misrepresenting his proposition. The solicitor makes an estimate based on the above wiring schedule and then adds from 5 per cent to 15 per cent margin to cover the cost of carrying the account and merchandising. From this margin the company deducts $1 as a fixed charge and pays the solicitor 30 per cent of the balance, the company applying the 70 per cent plus the $1 to pay the contractor and to meet its overhead charges. The solicitors also receive a salary in addition to the commission, the two netting them a very respectable income.

Evening solicitation is found to be especially effective. The salesman talks with the housewife during the day and gets her interested in electric lighting and then calls by appointment in the evening when the man of the house is at home. The wife's desire for the service acts as a leverage upon the husband, and it often happens that solicitors come into the office at 5 o'clock without an order but come down the next morning with two or three. The company in all cases makes the contract directly with the customer and sublets the wiring to one of the contractors, orders being assigned to each contractor approximately in proportion to the size of his establishment.

### Advertising Plan

In addition to full-page newspaper advertising used in conjunction with the contractors, the company has taken space regularly twice a week in both daily papers. To this space on Saturday evening and Sunday morning the heading "Current Topics" is given, and the space is filled with news of an electrical nature. The names of all persons ordering their homes wired and those who have purchased new electric irons, toasters, vacuum cleaners, etc., during the week just past are published. There are also short articles on the various uses of electricity in the home and many personal items about how someone is utilizing new appliances. Another function of "Current Topics" is to advertise that certain vacant houses have just been wired and are for rent. More direct results have been traceable to this form of advertising than to any other ever tried in Mr. Basham's fifteen years of experience. People call the office and say that they notice "Mrs. Robinson has had her house wired," and add that they would like to know the cost of wiring their homes.

In addition to the newspaper advertising, at the beginning of the campaign 10,000 cheap handbills were

SCHEDULE OF CONTRACTORS' PRICES FOR HOUSE WIRING

| | | First Floor | Second Floor |
|---|---|---|---|
| Cottage: Open attic | Outlet | $2.00 | .... |
| | Snap switches | 2.25 | .... |
| | Flush switches | 2.75 | .... |
| | Three-way snap switch | 3.35 | .... |
| | Three-way flush switch | 3.80 | .... |
| Cottage: Floored attic | Outlet | 2.25 | .... |
| | Snap switch | 2.45 | .... |
| | Flush switch | 3.00 | .... |
| | Three-way snap switch | 3.75 | .... |
| | Three-way flush switch | 4.20 | .... |
| Two-story house: Open attic | Outlet | 2.70 | $2.00 |
| | Snap switch | 3.15 | 2.25 |
| | Flush switch | 3.60 | 3.00 |
| | Three-way snap switch | 4.75 | 3.35 |
| | Three-way flush switch | 5.00 | 5.00 |
| Two-story house: Floored attic | Outlet | 3.00 | 2.25 |
| | Snap switch | 3.50 | 2.45 |
| | Flush switch | 4.00 | 2.75 |
| | Three-way snap switch | 4.75 | 3.75 |
| | Three-way flush switch | 5.00 | 5.00 |

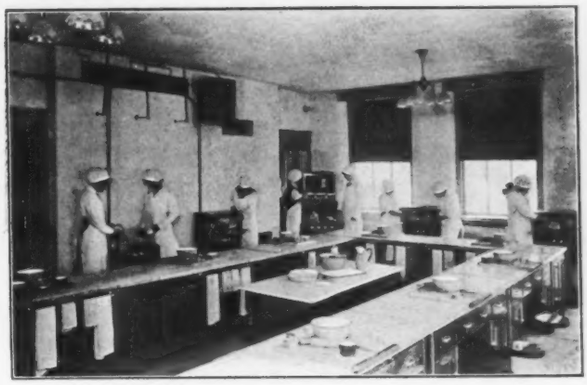
Where the attic is finished, the entire house is figured on the first-floor schedule. Single circuit jobs do not include cabinet.

delivered by messengers to practically every house in the city. These bills displayed the house-wiring proposition on one side and advertised special prices on fans and flatirons on the other side. The results of these were very satisfactory. Early in the campaign, before the salesmen were acquainted with the people in their territory, a letter stating, for example, that "Mr. Lawrence of the Edison Company" would call upon them was sent out two or three days in advance of Mr. Lawrence's call. A bulletin is run in the street cars which reads, "Is your home bright with electric light?" A card advertisement is also carried inside the cars. The letterheads and envelopes used by the company are in keeping with the rest of the campaign. The bills sent out are stamped with a rubber stamp bearing some such message each month as "Electric toasters and percolators make good breakfasts." Every available opportunity for advertising has been taken, and the results make clear the wisdom of it all.

### Results of the Campaign

With the reduction of the residence lighting rate from 9 cents to 7 cents per kilowatt-hour there was a decrease in revenue the first month of $1369.75 under the corresponding month for the year before. Then the new-business campaign began, and for the first six months under the reduced rate the revenue was only $211.53 less than for the corresponding six months last year. The third month after the rate was cut showed an increase over the corresponding month last year. For six months of 1914 the residence energy consumed was 348,372 kw.-hr., while for the corresponding six months of 1915, under the reduced rate and increased business, it was 468,742 kw.-hr., or an increase of 120,370 kw.-hr. For the first five months of the campaign 950 old houses were wired for electricity, and the company made a profit over and above all costs, as already stated. Dependence has not had to be put on profits from selling electrical energy to pay any portion of the wiring cost.

The appliances were also pushed in connection with the general business campaign, and after the handbills were distributed offering flatirons for $2.50 each, 144 were sold in three weeks and more than 800 were sold in six months. This is in competition with 25-cent natural gas. Other appliances have sold well also, and the result of the whole plan has been to increase the company's load to show a gain rather than a loss of revenue for the year's business in spite of the necessity of making a material reduction in its rate. The keynote of the campaign was the fact that the houses were wired at a profit and not at a sacrifice to the company.



ELECTRIC COOKING IN THE DOMESTIC SCIENCE CLASS—THE SCHOOLGIRL OF TO-DAY IS THE HOUSEWIFE OF TO-MORROW

# Promoting Electric Cooking Through the Rising Generation

## The Growing Educational Opportunity Presented Through Electric School Equipment and Electric Toys—The Future Housewife as a Factor in the Market for Electric Service

GREAT transmission systems have learned that it is necessary to look ahead into the growing future and plan the work to suit the rising generation. The telephone companies build their switchboards and their cables with capacity to care for an increase in population and resultant multiplication of traffic. Street railways map extensions which will tap new territory that shows indication of impending development. The central-station power plant is both situated and equipped not for the day but for the decade, with a careful provision for demands entirely theoretical and still beyond the horizon. And now we see a growing evidence that this principle is no less susceptible to application in the work of selling. The industry is beginning to look upon the girl and the boy as very material factors in the market.

The idea first attracted serious attention through the extensive introduction of domestic-science classes in the women's colleges and schools. Immediately it brought the opportunity for installing gas or electric stove equipment, and the authorities were naturally receptive, since it was the aim of the work to render the course as modern and as economic as possible. The main objective which the public service company had at first was to secure the business, for such installations effect a good consumption; but it was not long before the educational value of the innovation became apparent and productive.

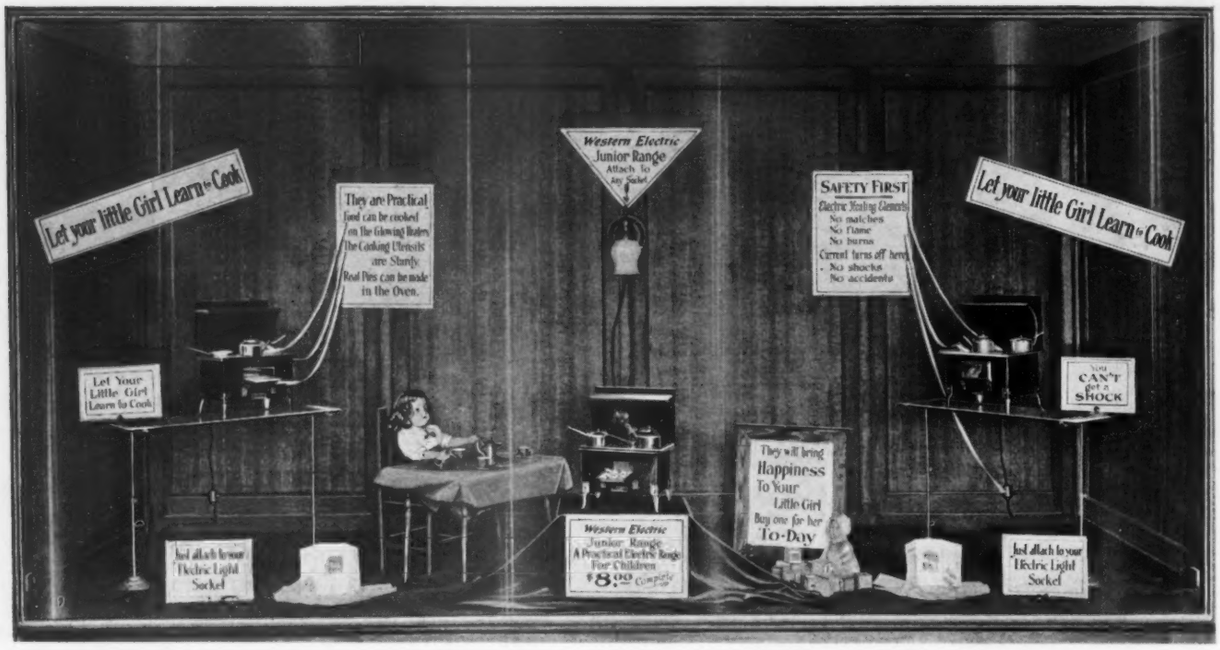
### Demonstrating to the Mother as Well

It was realized that the schoolgirl of to-day who uses electricity for cooking will be the housewife of to-morrow, with a strongly ingrained inclination to utilize electric service in her home in all its modern applications. And in the meantime the enthusiastic interest of a daughter in the use of electric-cooking devices in her school work is a most effective demonstration to her mother and the shortest road to immediate business. And so the idea has spread till the opportunity has been almost universally recognized by central-station men, and the selling work that is being done gives promise that before long electric ranges will feature in the domestic-science department of every modern school.

A most interesting further extension of this thought has become available through the introduction of the toy range just perfected and placed upon the market by the Western Electric Company—the "junior range." As a factor in the nation-wide work of education that the industry is prosecuting so persistently, it promises to exert a tremendous influence, and it focuses the attention squarely on this hitherto untraveled avenue of approach. The device itself is most ingenious and appealing, a tiny range that stands just 15 in. high, with a cooking surface of 88 sq. in., exclusive of the little oven underneath. This oven measures 4½ in. wide, 5 in. deep and 2¼ in. high. The relative size of the range is indicated in the picture showing the children playing with it. In the stove top are six heating holes, beneath which are the heating elements, and a set of little utensils is provided for baking and frying, broiling or boiling. The range is connected to the nearest baseboard outlet or lamp socket, and a switch in the cord close to the range enables the child to turn the current on and off. The range will retail for $8, and it is estimated that in service it will consume about as much as a standard flatiron.

As the manufacturer points out in its extensive advertising, there has been no striking innovation in toys for little girls since the invention of the sleeping doll, and the market for a toy electric range should be most favorable. The cost is, of course, somewhat higher than the average, but, on the other hand, electrical and mechanical toys have come for boys and sold successfully, and there seems to be no reason why this more ambi-

GAINING THE INTEREST OF THE LITTLE GIRLS WITH THE MINIATURE ELECTRIC RANGE


Let your little Girl Learn to Cook
They are Practical
Food can be cooked on the Glowing Units
The Cooking Utensils are Sturdy
Real Pies can be made in the Oven.
Western Electric
Junior Range
Attach to any Socket
SAFETY FIRST
Electric Heating Elements
No matches
No flame
No burns
Current turns off here
No shocks
No accidents
Let your little Girl Learn to Cook
Let Your Little Girl Learn to Cook
You CAN'T get a SHOCK
They will bring Happiness To Your Little Girl Buy one for her To-Day
Western Electric
Junior Range
A Practical Electric Range For Children
$8.00 Complete
Just attach to your Electric Light Socket
Just attach to your Electric Light Socket

A SHOW-WINDOW ARRANGED TO INTEREST BOTH THE CHILDREN AND THEIR PARENTS IN THE JUNIOR ELECTRIC RANGE

tious toy for girls should not prove quite as popular. There can be no question as to the appeal that it will make to the child, for cooking has been a favorite, though heretofore a dangerous and impracticable, play through the generations, and, as refined in this electric range, it should certainly be acceptable to every mother, because of its cleanliness and safety. The fact that here is a real stove—not a dummy—makes an instant appeal to the youth that lingers strong in every one of us, and among the parents and friends it will have a wonderful power for good in the stimulation of a greater interest in electric cooking.

This "junior" range has crystallized a thought and induced a policy that has been long "a-borning"—to reach the adult through the child and educate the rising generation from the earliest years, that when they grow to manhood and womanhood the idea shall have grown from seed to fruit. To-day the industry is forced to struggle for the conversion of grown-up minds that have already become accustomed to the habitual use of other methods. If we can make these educational efforts embrace the children at the same time, how much work will we be saved when these same children come to be our customers. It is a national problem that affects the entire industry, and yet, before all, it is local opportunity, and each central-station manager should look ahead to coming years and make provision for a higher bounty of prosperity.

## Electrical Breakfast Sets in This Christmas Window

During the Christmas shopping period the electrical dealer has great opportunities for selling electrical devices for gift purposes. The accompanying halftone shows the show-window display employed by the L. W. Cleveland Company, Portland, Me., during last December. Holly and evergreens, as well as special gift boxes for the Christmas season, gave a Yule-tide atmosphere to the window and suggested to passers-by solutions of their gift problems. The table in the center of the display added to its attractiveness and indicated the utility of electrical devices on the table.

HOLLY-PAPER AND CHRISTMAS BOXES BRIGHTEN THE WINDOW DISPLAY

## Lest the Customer Forget

A thriving laundry in Chicago consistently advertises the gratuitous service which it furnishes to its patrons by emphasizing, whenever appropriate, the fact that its employees sew on buttons and darn hosiery free of charge. When either of these services is performed for a customer a tag is attached to the article mended to call attention to the fact that the laundry company has contributed without charge to the comfort and convenience of its patron. The tag forms a sort of personal connection between the company and the customer, and in its quiet and unassuming manner it says to the patron: "See! We have your interest at heart. We have done something for you."

Such tags, altered of course to suit conditions, might help central-station companies to reap a fuller advertising benefit from gratuitous service. When a free service is rendered without comment patrons too often forget both the deed and the spirit which actuated it.

# Christmas Merchandising Co-operation—Ready for You

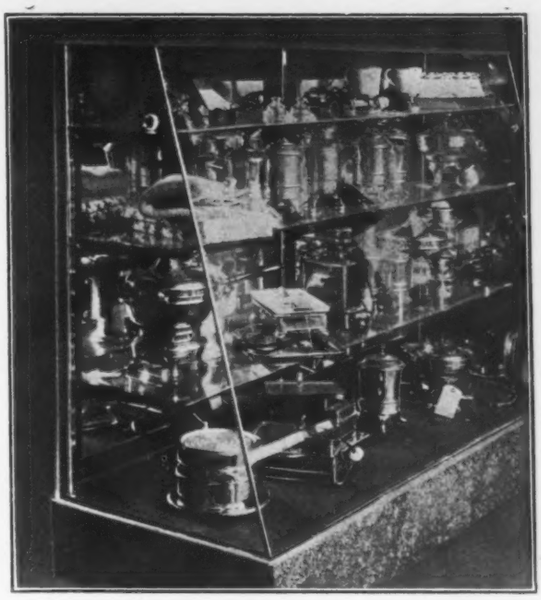
## How the Manufacturer Has Assumed a Great Part of the Electrical Dealer's Burden, and Through Sales Helps Has Insured the Holiday Opportunity

TIME was—and not so very long ago—when every man who hoped to sell electrical material at Christmas time was forced to do it for himself. The opportunity was undeniable, but against him was arrayed a mighty competition that embraced two powerful factors—the long-established stores that make the weeks of Christmas shopping their great annual harvest time, and the long-established habit of the public that carried the shopper by instinct to these other stores where she had done her Christmas shopping in the past. And so the man who offered electrical appliances as gifts felt that his voice was weak and small in such a chorus. But an interesting change has come to pass.

The manufacturers of these devices that are appropriate for the Christmas market have appreciated the need for a broad and influential effort on their part to assist the local man to win a big place in the market. Gradually they have developed a supporting service that has grown to powerful dimensions. And so to-day the central-station manager, the contractor or the dealer has all ready to his hand a variety and strength of suitable co-operation that put him in a position to secure the attentive interest of his community at Christmas time and make the shopping season pay him large returns in merchandising profits. Practically all the ammunition that he needs to make a gallant fight will be provided by the manufacturer who makes the goods he sells. There is no longer any excuse for any man ignoring this great selling opportunity.

### What the Retailer Needs

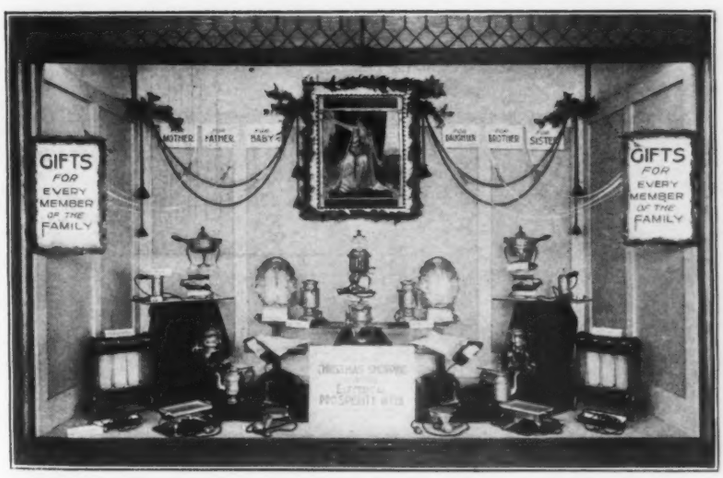
Granted that he has a store with show windows and is well stocked with the goods to sell, consider what the dealer needs to make a profitable Christmas campaign. He needs ideas and some assistance to enable him to make a creditable series of displays in his windows. He needs good cuts and able copy for his newspaper advertisements, if his message is to seize the shopper's attention among the bigger spaces that will be filled by his large competitors. He needs good advertising matter that he can send direct by mail to the homes of his community to invite the shoppers to come and see the suggestions that he offers. He must have new ideas and many of them to enable him to build up the essential Christmas atmosphere, both through the decoration of his store itself and the arrangement, packing and display of the goods. And to-day all this is offered in an infinite variety of "dealer helps" provided by the manufacturers. In short, if he is willing to utilize the material aid that is extended, the local man will find that about all that remains for him to do himself is to stock the goods and sell them energetically.



THE ATTRACTIVE PRESENTATION OF GOODS WITHIN THE STORE RANKS IN IMPORTANCE WITH THE PROPER DRESS OF THE SHOW WINDOW OUTSIDE

### What the Manufacturers Offer

A review of the Christmas campaign material that has been prepared this year by the different manufacturers is particularly interesting and impressive. It is so extensive, so diverse and so appealing in its spirit and its flavor, and so comprehensive in its purpose and



TWO SUGGESTIONS OFFERED BY ELECTRICAL MANUFACTURERS—THE WESTINGHOUSE AND GENERAL ELECTRIC COMPANIES. BOTH DISPLAYS PRESENT COLLECTIONS OF ELECTRIC APPLIANCES SUITABLE FOR CHRISTMAS GIFTS

THE CHRISTMAS WINDOW OF A CALIFORNIA CENTRAL STATION

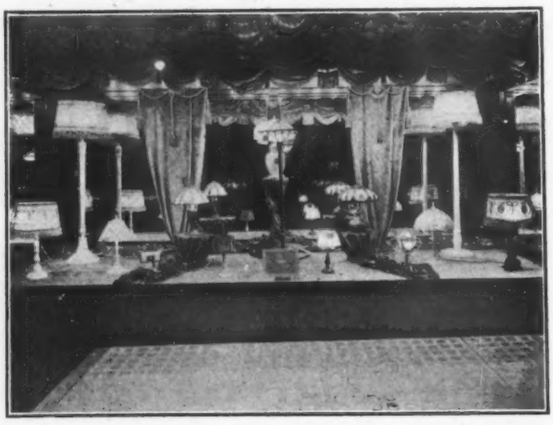
AN OHIO COMPANY'S ELECTRIC LOG-CABIN WINDOW ATTRACTION

its method, that no local retailer could ask for more or better. Nor can he find a possible excuse for not seizing on it eagerly—unless he simply lacks the natural ambition without which no success is possible.

Several of the large manufacturing companies circulate their Christmas suggestions in the form of a complete campaign in which the dealer receives not only samples of the advertising matter which is offered for his use but also a carefully conceived plan of procedure which is exceedingly valuable for the practical education that it carries. It is a contribution to the industry that represents both a great expenditure of money in the actual production of the book itself and the experience of years, freely tendered for the common good.

The local man who bids for Christmas business advertises in the newspapers. The manufacturers offer cuts and copy for his "ads" far better than he could produce himself. He has the opportunity to secure the publication of some interesting little newspaper articles about the electrical appliances which are appropriate for Christmas time, if he but prepare them for the editors in proper vein. This offers valuable publicity, but few men are skilled in writing of this kind and the local man can seldom "put it over." Yet the manufacturers are glad to provide such stories in a form that will be acceptable.

Then there are the ideas and plans for novel displays—both in the window and the store—which need display cards, price cards, counter, wall and window posters. It would cost a fortune for the individual central station to develop all the good material that is offered, yet it is all essential to the adequate campaign. Billboard posters, car cards, motion-picture slides and outdoor signs all help to build up the impression in the shopper's mind that she should visit the electric shop and see the gifts electrical before she makes her purchases; and on the strength of this impression everything depends. And to make this message personal and appealing, invitations, shopping lists, and booklets showing how fitting and inexpensive are these gifts, must be distributed among the homes.



BY REASON OF THEIR BEAUTY AND UTILITY LAMPS APPEAL TO THE HOUSEHOLDER—WHATEVER HIS TASTE OR THE SIZE OF HIS POCKETBOOK

The manufacturers have developed their Christmas co-operation to such a length that all this varied influence is now available. Goods are packed in holly boxes. Prizes of money are offered in many instances to the local salesmen for record sales of this or that appliance. Thousands and thousands of dollars are expended in the most ingenious and appealing advertisements in the popular national magazines, for the single purpose of strengthening the public interest in the goods the local man is selling. It only remains for him to do his part.

The man who failed to make a big success of this Christmas campaign last year should ask himself the reason why. The man who feels no great enthusiasm for this culminating opportunity, now again so fast approaching, should begin to probe at home for causes. For the electrical manufacturers have assumed no small part of his burden, and success waits only on a reasonable selling activity that will establish the electric Christmas gift before the shopping public.

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## "Yours for Service"—the Phrase That Closes an Ohio Contractor's Letter

Commenting favorably on the use of the phrase "Electrically yours," with which a Pennsylvania central-station company closes its letters, as noted in a recent issue, W. G. Heacock, manager of the construction department of the Electrical Maintenance Company, Youngstown, Ohio, has written to say that his company in its correspondence makes use of the closing line "Yours for service," which, he believes, is particularly valuable in leaving the proper impression of the company's attitude with the customer addressed.

ELECTRICALLY OPERATED CONCRETE MIXERS USED IN BUILDING UTAH ROADS

## State of Utah Uses Electric Power in Road Building

In many cases electricity has not been considered available for use on movable equipment, especially if any considerable distance is to be covered each day, owing to the expense of changing service connections. The Utah Power & Light Company has solved this problem, however, by mounting portable substations on wagons for contractors' use. Each substation is equipped with 1000 ft. or more of secondary cable, which can be paid out as needed, thus supplying a range of 2000 ft. without a change in location of the substation. If the contractor has enough electrical equipment to warrant the expense, he employs an electrician to look after his equipment, and this man is also competent to make primary connections to the power company's lines.

The State Road Commission of Utah, of which E. R. Morgan is engineer, is using an electrically equipped tractor concrete mixer in the construction of six miles of concrete roadway between Salt Lake City and Murray. The roadway is 16 ft. wide and 6½ in. thick and is laid on a rolled-gravel sub-base which had previously been put in. A one-half-yard cube mixer equipped with a 15-hp. three-phase motor is used. Nine hundred and fifty linear feet of roadway, requiring 305 cu. yd. of concrete, is being laid in an eight-hour day with an energy consumption of 121 kw.-hr., or 0.4 kw.-hr. per cubic yard.

The roadway is kept flooded with water for about three weeks after the bed is laid, and water for this purpose is pumped from ditches with a motor-driven triplex pump. Lines of 3-in. pipe are run out for a distance of 1500 ft. on each side of the pump, and these furnish water for the mixer as well as for flooding.

## A Seventy-Truck Electric Garage at Los Angeles

The Commercial Electric Garage has just moved from leased quarters to its own new buildings at 831 South Los Angeles Street, Los Angeles, Cal., where it has completed a thoroughly up-to-date electric garage for the housing of electric commercial cars. The ground area covered is 103 ft. by 140 ft., with a two-story front. In the rear of the ground floor the garage proper occupies 10,000 sq. ft., giving space for seventy trucks. There will be only a single row of pillars down the middle of the room, with trucks lined up on both sides. In the second story there will be 7000 sq. ft. of space for offices, sales and showrooms. H. W. Harrison is president and general manager.

SIGN PERFECT LETTERS DICTATE TO OPERATORS OF
THE STENOTYPE
The Fastest Writing Machine in the World
SPEED, ACCURACY, LEGIBILITY
Start Saving Today
TNA TRUST
& SAVINGS CO.
HOW ABOUT YOUR FUTURE?
4% PAID ON YOUR SAVINGS

FLOOD-LAMP FIXTURE FOR BILLBOARD LIGHTING, INDIANAPOLIS, IND.

## A Method of Billboard Lighting That Saves Cash

A new and more economical method of lighting billboards which has been put into use by the Thomas Cusack Company at Indianapolis utilizes the flood-lighting principle, the lighting units being mounted on iron-pipe standards in front of the board.

How much more effective as well as less expensive this flood-lighting type of construction is, compared with the ordinary method of using border angle reflectors, may be judged from the accompanying tabular comparison of the expense necessary to equip a board of the size shown herewith and the total candle-power available in each case:

COMPARATIVE COST OF BILLBOARD-LIGHTING EQUIPMENT

| | Old Method | New Method |
|---|---|---|
| Total wattage to illuminate signboard | 3000 | 3000 |
| Number of lamps | 30 | 4 |
| Rating of individual lamps, in watts | 100 | Two 500 and two 1000 |
| Total candle-power given by all lamps | 2400 | 6000 |
| Cost of thirty angular hoods | $150 | .... |
| Cost of four standards | .... | $60 |
| Cost of lamps | $12.90 | $19.30 |
| Total cost | $162.90 | $79.30 |

In the cost of material alone it is possible to effect a saving of more than 50 per cent, and employees of the Cusack company who have built both types of boards declare that a board of the new type is less expensive to wire. Considered from the standpoint of appearance, the flood-lighted board is generally admitted to be the more attractive of the two, regardless of whether it is viewed by night or by day.

BILLBOARD ILLUMINATED BY FLOOD-LAMP UNITS ERECTED IN FRONT OF THE BOARD

## "Tip Card" Aids in Finding Sales Talent

Cards for transmitting "leads" on new business to the sales manager are distributed among all employees of the Merchants' Heat & Light Company at Indianapolis, Ind., outside the sales department. To the employee turning in the greatest number of "live" tips—that is, tips which result in business—before the end of a set period a prize of $10 is awarded. Besides aiding the sales department in locating prospective purchasers quickly, the cards have afforded the sales manager hints as to what men in other departments of the organization might be regarded as future salesmen.

MANAGER SALES DEPARTMENT:

I have been talking to M._____

_____ Street

and believe we can secure this business if representative will call. Can be found at

_____

_____

Date _____ 191__ _____ Dept.

SUGGESTION CARD FOR NON-COMMERCIAL EMPLOYEES

## Minimizing the Report Evil and Making Solicitors Salesmen, Not Clerks

Many progressive companies no longer require long reports on daily calls from solicitors, because it is their sales managers' desire to have their men spend all available time in selling. "The quickest and most efficient method for disposing of this report bugbear," comments a sales manager in the Middle West, "is to have the men dictate reports successively and in a set and prearranged order to a single stenographer at the beginning of the morning sales conference. In this way the sales manager and all the salesmen hear the report of each of their fellows, while the stenographer makes a permanent record of the reports. Reluctance to report failure to his associates spurs many a man to greater efforts. After each man has reported on his calls, the stenographer retires from the meeting, the salesmen have a few minutes to exchange leads or "tips" secured on the previous day, and the meeting proceeds as usual.

"With a little practice and systematizing," concluded this sales manager, "my department of twenty-two men has perfected this plan until the entire procedure of reporting now requires less than ten minutes."

## Making Good Use of Letters Commending the Company's Service

It is the practice of the Dayton (Ohio) Power & Light Company to hang neatly framed letters commenting on the company's service in its offices where the public may view them. These letters are changed from time to time, those of more recent date replacing older letters. Hanging in one of the company's offices at present are two letters in which both the company's officers and its men take justifiable pride. These letters are printed herewith to illustrate how the written opinions of electric-service company's patrons may be used to emphasize the fact that the company's service is just as good as its most enthusiastic salesmen claim.

CITY OF DAYTON.
H. M. Waite, City Manager.

DAYTON, OHIO, Sept. 10, 1915.

DAYTON POWER & LIGHT COMPANY, Dayton, Ohio:

GENTLEMEN:—May I take this opportunity of congratulating you upon your service? Last night, shortly after the storm, your men called up the house and asked about the lights, and when told that they were out a man was on the job and had them in again in ten minutes. Very truly yours,

H. M. WAITE, City Manager.

CITY OF DAYTON.
G. W. Shroyer, Mayor.

DAYTON, OHIO, July 17, 1915.

DAYTON POWER & LIGHT COMPANY, Dayton, Ohio (Service Department):

GENTLEMEN:—I wish to thank you very much for the prompt action that you took on my request with reference to the lamp on the corner of Potomac and McLain Streets, which was complained of by a neighbor as not being lighted. In less than an hour after I called the light was burning. This I consider extremely good service. Very respectfully, G. W. SHROYER.

## Telling the Story of Public Service to the Public

Methods of bringing the public mind into harmony with the local utility corporation are always of interest, for there is scarcely any other problem which requires such careful analysis of all local conditions.

The accompanying example shows the type of newspaper advertising being done by the Cleveland Electric Illuminating Company to interest the local public in its problems of generation, distribution and service. The "ads" have been attractively prepared and the text is of such character as to give a real meaning to the company's slogan, "Not merely electric light, but also illuminating service." The advertisements appear weekly.

*Watching Over* 128,000 *Horse Power of* ELECTRIC ENERGY

In the switch house of our Lake Shore Generating Plant an operator watches hourly two huge switch boards, one showing the electrical output of every turbine in the plant, and the other showing its distribution over a network of 11,000 volt feeders to nine substations.

This immense feeding system is the foundation of "Illuminating" service. It keeps all substations supplied to meet any demand which may be made upon them by our customers. It is important to keep it in steady operation.

If there is any drop in voltage, it is immediately registered on the "incoming" switch board; and the operator signals for more power. If anything goes wrong with a feeder the trouble is indicated at once on the "outgoing" switch board; the proper switch is thrown and off goes the power until repairs can be made. If a cable should blow up the current would automatically flow over other cables to the same substation. Precautions like these, and the ample reserve capacity always maintained, assure dependable Illuminating service.

THE ILLUMINATING COMPANY
*ILLUMINATING BUILDING, PUBLIC SQUARE*

NEWSPAPER ADVERTISEMENT AT CLEVELAND

# Station and Operating Practice

*A Department Devoted to the Problems of Installation, Operation and Maintenance of Equipment for the Economical Generation and Distribution of Electrical Energy for All Uses.*

# Handling Summer and Winter Loads in a Y. M. C. A.—II

## Utilizing Exhaust Steam, Home-Made Water Heaters, Removing Oil and Acid from Feed Water and Condensate from Steam Lines, Air-Lift Water Pumping, and Annual Water, Coal and Oil Requirements

METHODS of equipping boilers and furnaces and operating engines to handle the summer and winter loads in the Young Men's Christian Association at Newark, N. J., were described in the Nov. 13 issue of the ELECTRICAL WORLD. In what follows are described ways of draining condensate from steam pipes, removing oil and acid from feed water, extracting air from water raised by air-lift so that reciprocating pumps will not pound, and methods of heating water for boilers and building service. Station performance data are also included.

Exhaust steam from the prime movers and auxiliaries is passed through an oil separator. From this it can be delivered to the heating system, water heaters or atmosphere. Drain pipes are connected with every part of the exhaust-steam line where condensate is liable to collect. A method of discharging the water so collected to the sewer without breaking the partial vacuum maintained is shown in Fig. 1. Steam traps connected with the high-pressure lines return condensate to the boilers by way of the feed-water heater.

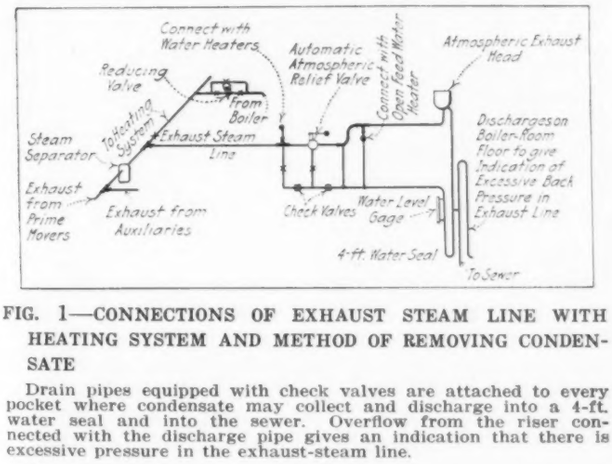



FIG. 1—CONNECTIONS OF EXHAUST STEAM LINE WITH HEATING SYSTEM AND METHOD OF REMOVING CONDENSATE

Drain pipes equipped with check valves are attached to every pocket where condensate may collect and discharge into a 4-ft. water seal and into the sewer. Overflow from the riser connected with the discharge pipe gives an indication that there is excessive pressure in the exhaust-steam line.

### Home-Made Feed-Water Heater — Ways to Prevent Oily Water Being Drawn by Feed Pumps

An atmospheric-type feed-water heater is employed. Its construction is shown in Fig. 2. Returns from the heating system, drains from the high-pressure mains and make-up water are delivered to a perforated pipe extending horizontally through the steam space. As the water sprays from this pipe and drops to the bottom it is heated. A piece of zinc is placed in the bottom of the tank to neutralize acid. The tank is cleaned once a year.

To prevent oily surface water being drawn off by the boiler-feed pumps, the discharge pipe is equipped with a goose-neck fitting as shown in Fig. 2. Normally the water drawn from the heater is sucked chiefly through the lower end of the T connected with the goose-neck, so there is not much tendency for the surface water to be drawn in. When the water level drops to the level of the intake, air is sucked in by the pumps, which indicate this condition by speeding up. Two Marsh boiler-feed pumps are installed, one being operated until it needs repairing, when the other is put in service, the best pump being thus kept in reserve all the time. This practice is followed with all of the pumps. With a load of about 8.4 kw. one feed pump has to be operated continuously at about forty-six strokes a minute. The pumps have 5-in. by 3-in. by 3.5-in. cylinders. A Metropolitan injector is also installed for emergency boiler feeding.

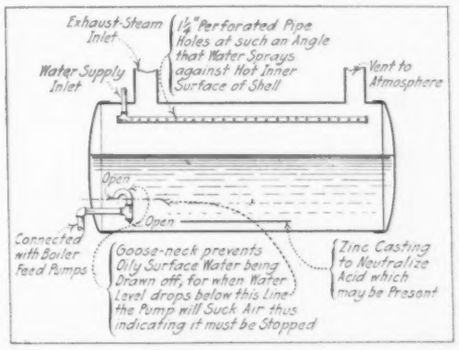

Exhaust-Steam Inlet
1¼" Perforated Pipe Holes at such an Angle that Water Sprays against Hot Inner Surface of Shell
Water Supply Inlet
Vent to Atmosphere
Open
Open
Connected with Boiler Feed Pumps
Goose-neck prevents Oily Surface Water being Drawn off, for when Water Level drops below this Line the Pump will Suck Air thus indicating it must be Stopped
Zinc Casting to Neutralize Acid which may be Present

FIG. 2—OPEN-TYPE FEED-WATER HEATER EQUIPPED TO NEUTRALIZE ACID PREVENTS DISCHARGE OF OIL IN WATER

Water forced through the perforated pipe is heated by passing through the steam space and impinging on the hot shell of the heater. A piece of zinc casting neutralizes acid in the water, and the goose-neck on the discharge pipe prevents oily surface water being drawn off.

Another precaution which has been taken to prevent oil getting into the boilers has been to attach small standpipes to the pump suction and discharge lines. The standpipe on the suction line is 2.5 in. in diameter and about 6 ft. high, the one on the discharge line being

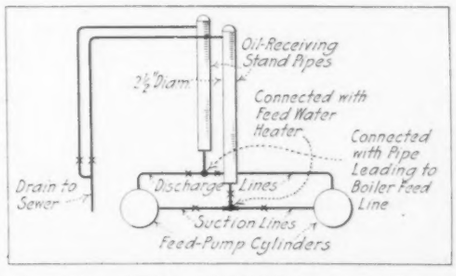



FIG. 3—OIL-COLLECTING STANDPIPES ON THE FEED-PUMP SUCTION AND DISCHARGE LINES

The feed pumps are operated continuously and at a moderate rate so that oil in the water passing under the standpipes will have an opportunity to rise therein. The collected oil may be discharged into the sewer when the pumps are slowed up or stopped entirely, as the head on the pumps is slightly greater than the height of the pipes. These standpipes also maintain sufficient head on the pumps when they are operating at high speed so that the water will not flash into steam.

smaller and shorter. The tops of both standpipes are connected by a small pipe with the sewer. Owing to the low rate at which water flows through the feed line, any oil which is present therein rises in the standpipe. It may be blown off periodically by opening a valve in the pipe leading to the sewer.

The standpipe in the suction line, by storing up a small quantity of water between strokes, maintains a practically constant head on the pump, thus preventing the hot water flashing into steam when the pump is speeded up. This condition could occur, but for the standpipe, if the pipe friction reduced the head on the pumps sufficiently during high rates of feed.

### Heater for Building Water Supply

Although an instantaneous water heater and two other types of heaters are installed for heating water for the shower baths and swimming pool, it has been found more satisfactory to use a home-made heater. Cross-sections of this heater are shown in Fig. 4. It consists of a magnesia-insulated cylindrical steel tank having an inlet and outlet for water and containing a number of 1.25-in. brass tubes through which exhaust steam is allowed to flow. Steam enters the tubes at the top through a U-shaped header. The tubes terminate in a similar header at the bottom. The condensate drains into a sewer in summer and in winter is drawn off by a 5-in. by 6-in. by 10-in. American vacuum pump which receives returns from the heating system. Well water at about 58 deg. Fahr. enters the tank near the top and, being cold, settles. As it becomes heated it rises and is discharged through another pipe several inches above the inlet. About 45 lb. hydraulic pressure is maintained in the tank by storage tanks on the roof. When considerable water is being used the heater produces a slight vacuum.

### Arrangements for Deep-Well Pumping

All water used in the Y. M. C. A. except for generating steam is obtained from a 500-ft. well just outside the building. The water is raised through 300 ft. of 2-in. pipe, by the air-lift principle, an air compressor being operated fourteen hours a day for this purpose. A duplicate compressor is installed as a reserve. Both

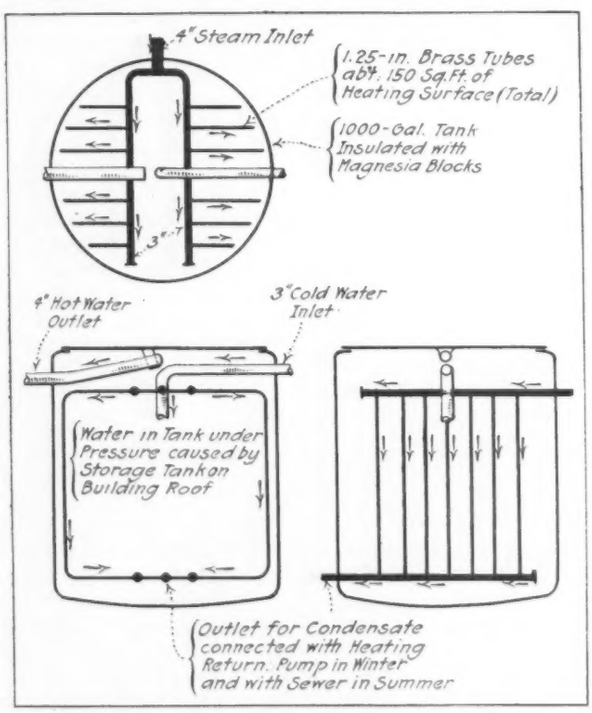

4" Steam Inlet
1.25-in. Brass Tubes abt. 150 Sq. Ft. of Heating Surface (Total)
1000-Gal. Tank Insulated with Magnesia Blocks
3"
4" Hot Water Outlet
3" Cold Water Inlet
Water in Tank under Pressure caused by Storage Tank on Building Roof
Outlet for Condensate connected with Heating Return. Pump in Winter and with Sewer in Summer

FIG. 4—HEATER FOR BUILDING-SERVICE WATER

units are Ingersoll-Rand machines and have 10-in. by 10-in. by 10-in. cylinders. In summer they are operated at about 152 strokes a minute and 85 lb. pressure, pumping about 51 gal. to 52 gal. a minute at this speed. Compressed air is also used for cleaning the boilers and blowing out the generators.

Attached to the top of the deep-well discharge pipe is an exhaust head like those used on steam lines. A horizontal pipe conveys the water from this head to a surge tank in the engine room. The exhaust head and surge tank permit most of the air entrained in the water to escape so pumping will not be hindered. Duplicate house pumps are installed. Only one of these is operated at a time, lifting the water to two wooden storage tanks on the roof having 35,000 gal. capacity. Overflow pipes from these tanks discharge into the surge tank so that an indication is given when they are full. A gage on the pressure side of the house pumps also shows the elevation of water in the tanks. One of the house pumps is a Marsh engine with 6-in. by 5-in. by 12-in. cylinders. The other unit is a National pump with 7-in. by 6-in. by 10-in. cylinders. With an air compressor working at the speed previously mentioned the National pump is operated at about seventy-two strokes a minute.

### Water Required for Swimming Pool and Shower Baths

During December, a typical winter month, about 900,000 gal. of well water is pumped, and in August about 1,200,000 gal. Nine months of the year a 25,000-gal. swimming pool must be refilled three times a week. During the other three months it must be refilled six times a week. This means heating this much water from 58 deg. to 72 deg. Fahr., the final temperature of the pool. The shower baths, of which there are about eighteen, are used about three to four hours a day except Sundays, the average demand for hot water being approximately 40 gal. a minute. They require water at about 100 deg. on the average. The amount of steam generated is not measured, but for three months in summer when the plant operates non-condensing the consumption of city water is about 45,000 cu. ft., some of this being used for sanitation. In a similar period during the winter about 22,000 cu. ft. is required.

### Coal, Oil and Waste Used Annually

The coal consumption in summer is about 45 tons per month and in winter 80 tons. About 9.8 tons of ashes are obtained in August and 14.6 tons in January. The cost of removing ashes is $18 a month. The annual coal consumption for nine years is given below:

| Year | Tons | Year | Tons | Year | Tons |
|---|---|---|---|---|---|
| 1906 | 713 | 1909 | 630 | 1912 | 680 |
| 1907 | 735 | 1910 | 623 | 1913 | 677 |
| 1908 | 693 | 1911 | 721 | 1914 | 738 |

The rate at which coal is used during the year is shown by the accompanying monthly tabulation of tons consumed in 1914 and 1915:

| | 1914 | 1915 | | 1914 | 1915 |
|---|---|---|---|---|---|
| January | 74.00 | 76.25 | July | 49.00 | 48.00 |
| February | 57.75 | 72.50 | August | 53.50 | .... |
| March | 85.50 | 78.00 | September | 51.00 | .... |
| April | 56.00 | 56.00 | October | 56.50 | .... |
| May | 57.50 | 54.00 | November | 57.25 | .... |
| June | 49.75 | 50.50 | December | 88.50 | .... |

"Arctic" oil is employed for lubricating the engines, about 150 gal. being used a year. For cylinder lubrication "600 W. Vacuum" oil is employed, the consumption being about 200 gal. a year. Waste is used quite liberally, 100 lb. lasting about five to six months.

The amount of exhaust steam used for heating can be judged from the size of the Y. M. C. A., there being about 125 rooms besides the usual reading and classrooms, office, auditorium and gymnasium. The average

summer-day electrical load is about 9.6 kw. At night this load is about tripled. When the gymnasium and classrooms require light the electrical load may reach 48 kw. A chief engineer, two assistant engineers and a helper are employed. C. W. Hummel is the chief engineer.

## Action of Oil and Scale-Forming Impurities When Present in Boilers at Same Time

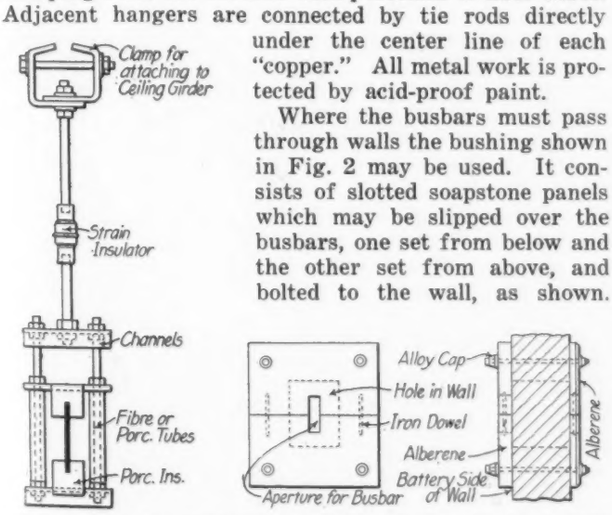
The action of grease in a boiler is peculiar. Grease does not dissolve or decompose in water, nor does it remain on the surface. Heat in the water and its violent ebullition causes the grease to form in sticky drops which adhere to and varnish the metal surfaces of the boiler. This varnish by preventing the water from coming into intimate contact with the metal prevents it from absorbing the heat, and this causes a blistering or burning of the plate that may result in a serious rupture or a violent explosion.

Grease balls may form in boilers at the surface of the water and eventually adhere to the heating surfaces if oil, grease and carbonates of lime and magnesia are not removed from the feed water. These balls are formed by flocculent particles of calcium and magnesium carbonate (which are precipitated by the boiler heat) combining with the grease floating on the surface and making a sort of insoluble and sticky soap which is shaped into balls by the motion of the water.

## Hangers and Wall Bushings for Storage-Battery Busbars

In the accompanying drawings are shown methods of supporting storage-battery busbars and end-cell "coppers," as they are sometimes called. The support shown in Fig. 3 is merely a modification of that in Fig. 1, the former being designed to carry several busbars between which there is a difference of potential, while the latter is intended to support one or several bars of the same potential. The hangers in Fig. 3 consist chiefly of two horizontal channel irons fastened back to back by separators and supported from the ceiling or girder beams by vertical rods sectionalized by strain insulators. The busbars are laid on edge in porcelain seats resting on channel iron and are clamped thereto by a flat iron running across their upper edges, but insulated therefrom by similar porcelain blocks. The hanger rods and clamping bolts are covered with porcelain or fiber tubes. Adjacent hangers are connected by tie rods directly under the center line of each "copper." All metal work is protected by acid-proof paint.

Where the busbars must pass through walls the bushing shown in Fig. 2 may be used. It consists of slotted soapstone panels which may be slipped over the busbars, one set from below and the other set from above, and bolted to the wall, as shown.




FIGS. 1 AND 2—SUPPORT FOR BATTERY BUSBAR AND WALL BUSHING FOR END-CELL BUS

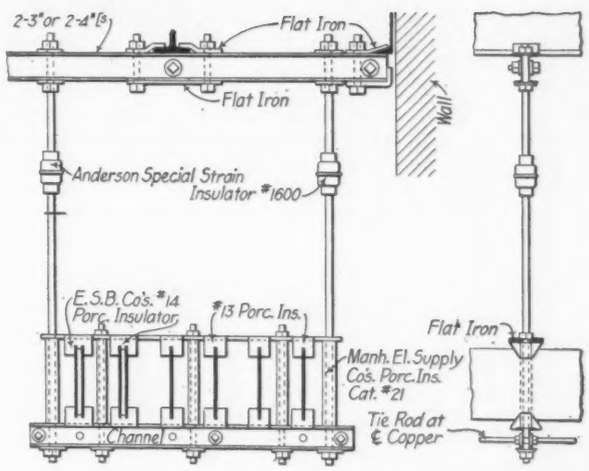



FIG. 3—SUPPORT FOR BATTERY END-CELL COPPERS

These panels permit leaving any desired clearance between the "coppers" and the wall and still close the aperture so that acid fumes from the battery room will not penetrate other parts of the building. The types of construction described herewith are employed by the New York Edison Company.

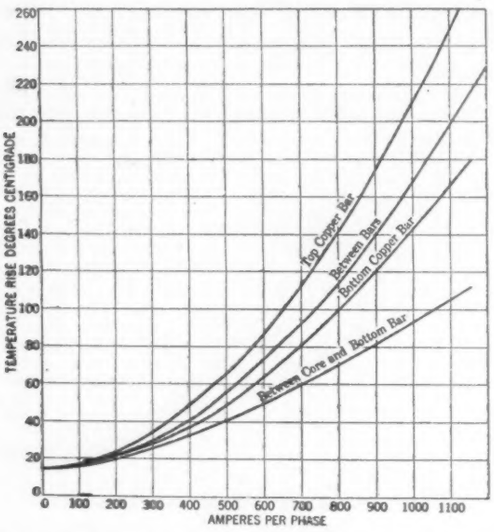
## Experimental Data on the Safe Operating Temperature for Mica Armature-Coil Insulation

The tests that have been conducted at the Niagara Falls Power Company's plant on a 3750-kva., 2300-volt generator indicate that the built-up mica insulation used in these machines has withstood temperatures from 120 deg. to 285 deg. C. for a time equivalent to nearly seven years' continuous operation. During about 62 per cent of this period the temperatures have ranged between 120 deg. and 145 deg., for about 21 per cent of the time from 145 deg. to 175 deg., for 12.5 per cent from 175 deg. to 210 deg., and for 4 per cent between 210 deg. and 245 deg. An examination of the insulation after this severe service, according to a paper presented before the A. I. E. E. by F. D. Newbury, showed that the mica was unchanged and the conductors were tight in the slots.

The generator which was subjected to these tests was the first one installed in the station of the Niagara Falls company and has been in service for twenty years. It has a stationary armature containing double-layer windings made up of two 1 11/32-in. by 7/16-in. bars per slot. These are insulated with a wrapper built up of mica splittings on a cambric base and held in position by an outside layer of linen tape. The mica in each wrapper is approximately three times as thick as the cambric.

Three series of tests were conducted to determine the maximum temperature in the windings. The first two tests were made by placing thermometer coils between bars in the same slot, at the bottom of the slots near the ends of the armature, and also halfway between ends. These tests, it was considered, gave the highest existing temperatures on the outside surface of the insulation, but a third test was conducted to ascertain the actual copper temperatures. Accordingly, special bars were made with the same kind and thickness of insulation as used on the original bars but were equipped with thermocouples in actual contact with the copper bars. One thermocouple was attached to each bar midway between each end and on one side. Four of these special bars were substituted for the original bars. Thermocouples were also placed on the outside surface of the insulation between bars in the same slot.

With the generator so equipped temperature tests were made at different loads. As expected, the temperatures of the upper and lower bars were found to be different owing to the eddy current losses in the outer bars. Furthermore, the temperature between bars was not even approximately the same as the true copper temperature. The curves shown herewith represent




TEMPERATURES OF ARMATURE BARS, ALSO OF SPACE BETWEEN BARS AND AT BOTTOM OF SLOTS

graphically the results obtained. It may be pointed out that the magnetic density in the core teeth was 11,000 c.g.s. lines per square centimeter, whereas densities 50 per cent greater are not uncommon at present. The current density at rated current is only 1400 amp. per square inch, while densities 30 per cent greater are common nowadays. As already mentioned, the eddy-current loss in the upper bars was considerable. In modern generators with a better distribution of losses the difference in temperature between coils and that between coils and core will be as a rule 10 deg. to 15 deg., instead of 50 deg., as was the case in this machine.

During 1914 a number of bars were removed from the winding and the insulation was examined. The mica appeared to have undergone no change in structure, mechanical strength or elasticity. The cambric, as would be expected, had lost its mechanical strength in all places and in many places had been reduced to a fine powder. Before removing the insulation on some bars puncture tests were made in which almost ten times the operating voltage was reached before the poorest sample broke down.

The initial tests mentioned were made by the operating company and the later tests by the engineers of the Westinghouse Electric & Manufacturing Company with the co-operation of L. E. Imley, superintendent of the power company.

## How the Compounding Effect of Interpole Generator Showed Up in Parallel Operation

BY E. C. PARHAM

When a direct-current generator is operated in parallel with another it may be cut out by reducing the load of the outgoing machine to almost zero, by means of its field rheostat, and then pulling its switch. When voltages of dissimilar machines that are normally operated singly are regulated by means of a Tirrill regulator, it may be impracticable to reduce the load of one of them to zero. This is true especially at the time of withdrawing one just after paralleling in order to withdraw without disturbing the line voltage.

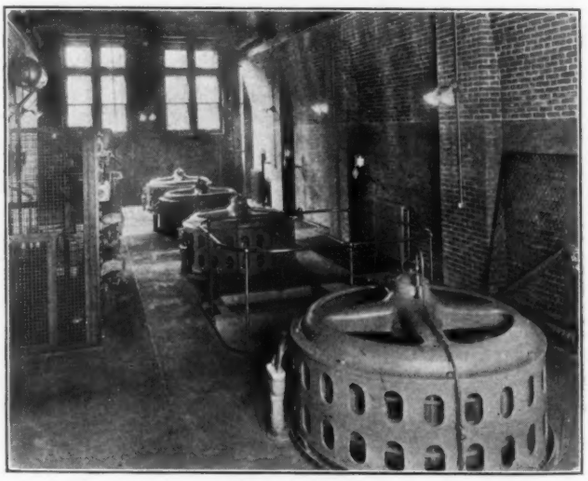
In one case a straight shunt machine and a shunt machine with commutating poles were used to relieve each other every twelve hours in the duty of exciting an alternator. There was no difficulty in reducing the load of the shunt machine before pulling its switch, but the load of the interpole machine could not be reduced below 40 amp., which was one-third of its full rating. The operator was justifiably "fussy" about the appearance of his highly polished switches, and he did not care to "score" the switch by pulling it with a current of 40 amp. flowing. As a matter of fact, repeated trials demonstrated that there was no objection to pulling the switch, because, on account of there being an alternate path through the other machine at the time of opening the switch, the resulting arc was negligible.

The high current maintained was due to the compounding effect of the commutating-pole winding. This compounding tendency of the interpole coils caused the interpole machine to hang on to its load notwithstanding the tendency of the equalizing rheostat to reduce it. The same effect made it easier to reduce the current of the straight shunt machine. In adjusting the compound of interpole compound-wound generators this compounding effect of the interpoles is a factor considered.

## Motor-Operated Pumping Installation to Handle Flood Water in Boston

The Public Works Department of the city of Boston now operates an automatically controlled electric pumping station to relieve flooding in the South End district. The station is at Albany and Union Park Streets and is designed for service only when there is a large surface run-off coincident with an extremely high tide. The storm sewers of the district were originally constructed to empty into a basin called the Back Bay, which was kept at a low water level. The filling of the Back Bay basin made it necessary to change the outlet of the system to South Bay, a tidal arm of Boston harbor, with the resulting difficulty that much of the area was constantly subjected to flooding during heavy storms when too much water was delivered into the storage sewers.

One 26-in. and three 36-in. Epping-Carpenter centrifugal pumps are installed in the new station, the 36-in. pumps each being directly driven by a 150 brake-hp. constant-speed, squirrel-cage induction motor



MOTORS AND CONTROL BOARD IN SEWAGE-PUMPING STATION OF CITY OF BOSTON

operating at 200 or 194 r.p.m., and the 26-in. pump by a 75-hp. motor of the same type at 240 or 233 r.p.m. Energy is purchased from the Boston Edison company, at 440 volts, three-phase, sixty cycles.

The motors were specially designed by the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., and are of the vertical-shaft type, each directly connected to the pump by a shaft about 20 ft. long. The pumps have a capacity of 30,000 gal. and 15,000 gal. per minute against a static head of 13.5 ft., the sewage being pumped into a main discharging to South Bay. A Cutler-Hammer switchboard carries contactors and other regulating apparatus for the motors, which are started by means of a float actuating a multipoint switch which closes five circuits in succession as the sewage rises in the intake chamber. The smaller pump is started first, and if not sufficient to care for the volume, one of the larger units comes into operation with each 3-in. rise in the chamber. As the sewage is lowered, the pumps are stopped in reverse order.

Only one watchman on duty at all times is required at the station, whereas a steam plant would demand the constant attendance of skilled engineers and firemen, and it would be necessary to keep steam up and fires banked to meet possible demands at any hour. With electrical operation, the maintenance cost is relatively small, particularly in the long intervals when the pumps are idle. Expert service from the main sewage pumping station can be called by the watchman by telephone when needed.

## Reinforcing Wood Poles with Steel Channels

By L. R. W. ALLISON

At the Dominguez Junction substation of the Pacific Electric Railway, near Los Angeles, Cal., a series of special terminal poles are in use carrying 15,000-volt transmission lines leading from the Redondo power station of the Pacific Light & Power Corporation to this substation, a distance of about 10 miles. The main transmission system comprises two parallel lines of wood poles with three double cross-arms per pole, each carrying two 312,000-circ. mil cables, making a total of twelve conductors for the entire service. These heavy lines required the adoption of terminal poles of special design, with suitable reinforcement to afford adequate protection against breakage and consequent interruption in service.

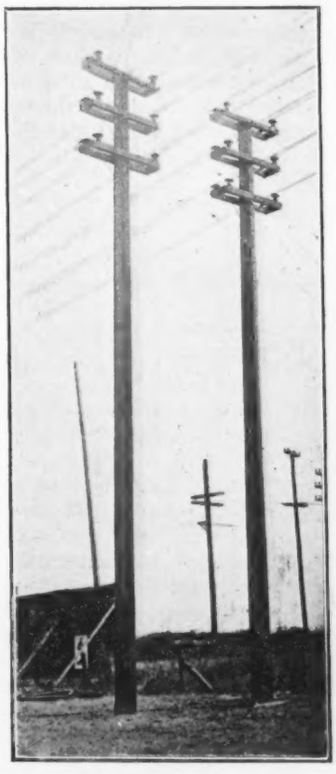


FIG. 1—POLES REINFORCED BY STEEL CHANNELS ON LINES OF PACIFIC LIGHT & POWER CORPORATION

For this installation it was decided to use extra heavy selected wood poles, 55 ft. long, with a top diameter not less than 9 in. and a proportionately large butt. These poles were reinforced throughout their entire length with two 6-in., 8-lb. steel channels, one on either strain side. This channel reinforcement was arranged as shown in the accompanying sectional view, the channel flanges being turned in, with the points in

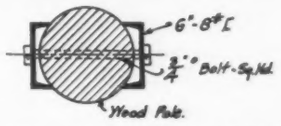



FIG. 2—METHOD OF BOLTING CHANNELS TO POLES

contact with the pole. The channels extend from base to top in one piece, including the pole distance in the ground. They were connected to the poles at the time the poles were set by 0.75-in. diameter square-head bolts placed 24 in. on centers at the bottom and on 12-in. centers from a point about 40 ft. above the butt to the top. After the poles and reinforcement were in place, cement was poured around the pole to the ground level to insure a substantial foundation.

At the immediate terminal entrance to the substation the lines are carried on strain insulators, three to the pole, while up to this point two-piece cemented porcelain insulators are employed, with regular cross-arm construction bolted through the channel sections, as will be noticed in Fig. 1. This method of pole reinforcement has proved highly satisfactory and efficient in connection with this transmission system. From the viewpoint of regular service, the conditions as evidenced here conclusively show the effective possibilities of this type of pole support.

## How a Water-Tube Boiler Was Repaired by an Electric Weld

By A. C. LASHER*

A severe leak at a defective joint under the cap on one of the lower row of tubes in a water-tube boiler recently developed at the power plant of the Macon (Ga.) shops of the Central of Georgia Railroad. When it was discovered the escaping steam and hot water had cut a deep groove almost through the tube header and had cut entirely through the steel shell of the mud drum just below. The hole in the mud drum was small, but the metal surrounding the hole, as well as that at the bottom of the groove in the header, was dangerously thin. The foreman boiler maker prescribed electric-arc welding as the remedy. Since the power plant is some distance from the electric-welding outfit in the machine shop, and as sufficient heavy conductor cable to run a temporary circuit was not available, an emergency arc welding outfit was improvised from an unused 125-volt steam-driven exciter in the engine room and a barrel of water.

The switchboard ammeter and voltmeter of the ex-

*Electrical engineer Central of Georgia Railway Company, Macon, Ga.

citer was used by making all connections back of the exciter panel. The negative lead from the exciter was taken to one side of the water rheostat, which consisted of two plates of scrap sheet iron, 16 in. by 30 in., placed parallel to each other and immersed in a barrel of salt water. From the other side of the water rheostat a lead was run to the operator's electrode holder at the job. For the return circuit the steam piping from the boiler undergoing repair to the frame of a 300-kw. steam turbine was used. Since the latter was the most convenient point, it was connected by means of a cable to the positive bus of the exciter.

In order to secure proper adjustment of the water rheostat, the circuit through the barrel filled with fresh water was first closed by clamping the electrode holder to the framework of the boiler setting. The exciter voltage was then increased to about 60 volts and sufficient common salt added gradually to the water to cause the load to increase to 130 amp. The clamp on the boiler framework was then disengaged and an arc started on a piece of scrap boiler plate. The final adjustments were made so as to maintain 130 amp. with 65 volts to 70 volts at the exciter. When satisfactory conditions of current and voltage had been attained, using the scrap piece of boiler plate as a test piece, work on the defective parts of the boiler was started.

Owing to the widely fluctuating load of from 0 amp. to 130 amp. before and after starting the arc, and to the fact that the exciter was run at a low point on its saturation curve the voltage regulation was somewhat severe for this class of work. However, the welder, being particularly skilled in his line, experienced no difficulty beyond a slight over-voltage at the instant of making contact.

The job was completed so that the boiler was ready for service in about two hours after first starting preparations for the repair. Only twenty minutes of this time was actually consumed in making the welds, the remainder having been employed in setting up and adjusting the apparatus.

## Points to Be Considered When Drying Out Transformers

One method of drying out transformers consists of applying a reduced emf. across the terminals of either the high-voltage or low-voltage winding and short-circuiting the other winding. At the rated frequency only about 1 to 5 per cent of the rated voltage is required to force full-load current through a transformer having a short-circuited secondary. Not more than one-fifth normal current should be allowed, however, if the transformer is not provided with its normal ventilation, since its temperature will rise above 85 deg. C., which is the maximum to which the insulation should be subjected.

Consider, for example, that three 75-kva., 11,000/440-volt, single-phase transformers must be dried out and 110 volts is the lowest pressure available for the purpose. Then it would be advisable to connect the high-voltage windings in series with the 110-volt circuit and short-circuit the low-voltage windings. This would impress $(110 \div 3)$ volts or about 0.3 per cent of 11,000 volts across the high-voltage windings. Such a pressure would force about one-fifth normal current through the windings. Thermometers should be placed between the high-voltage and low-voltage coils, however, and watched to see that the temperature does not become excessive. The transformers should be kept in a box with openings at the top and bottom to permit circulation of the air. A check can be kept on the thermometers by placing an ammeter in the short-circuited winding and keeping the current down to one-fifth the full-load value. Another precaution is to place fuses in each of the short-circuited windings.

Another, and probably the best, method of drying transformers is to circulate warm air around and through them. To accomplish this a motor-driven blower can be arranged to drive air through a number of electrically heated grids into the box containing the transformer. A thermometer should be placed in the inlet pipe leading from the grids to the box and the temperature kept between 80 deg. and 85 deg. C.

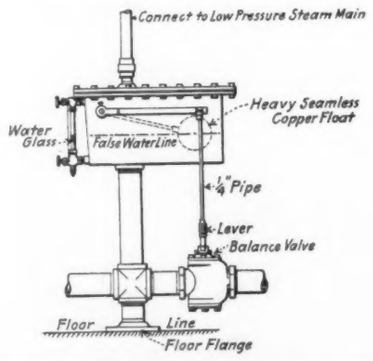
There is no definite rule for ascertaining when all of the moisture has been removed. With the larger sizes of transformers the drying process should be continued until a megger test shows that the resistance of the insulation has reached a constant value. At 50 deg. C. the resistance should be at least 800 megohms when the transformer is immersed in oil, and infinity when in air. If a megger is not available the temperature should be kept at 80 deg. C. for about seventy-two hours.

To dry oil for transformers, electrically heated grids may be immersed in it, brought up to a temperature of 212 deg. Fahr., and maintained so for twenty-four to forty-eight hours. The radiating surface of the grids should be as large as possible, preferably not less than 1 sq. in. per 5 watts dissipated in the grid. Before transferring the oil to the transformer it should be filtered through layers of cheesecloth or an oil filter.

The foregoing instructions embody recommendations by E. A. Quinn, general superintendent of the San Joaquin Light & Power Corporation, Fresno, Cal.

## False-Water-Line Arrangement for Steam-Heating Systems

It is often desirable to maintain a false water line in a heating system or in a certain portion thereof, particularly in connection with central plants for heating. The water trap shown in the accompanying illustration is a simple device arranged to accomplish this result. While prohibiting the passage of steam, it allows the free flow of condensation into the return main as fast as it collects. The trap is ordinarily at the end of the return main for each building at the point where it connects with the central return main. A heavy seamless copper float controls the balance valve installed in the return main by means of a lever and a connecting 1¼-in. pipe. The trap is supported by a floor flange cast solid and secured to the floor. From the top of the trap a 1¼-in. pipe is taken off and connected to the low-pressure main. The height at which the trap is set to maintain the false water line should be determined at each building and varies from 2 ft. to 6 ft.




CONNECTION OF WATER TRAP TO MAINTAIN FALSE WATER LINE

# Technical Advance in Theory and Practice

*Including a Digest of Important Articles Appearing in the Scientific and Engineering Press of the World*

## SERVICE RATES AND POWER-FACTOR

### Methods of Adjusting Charges in Alternating-Current Installations for Energy Consumption According to the Power-Factor of the Consumer's Demand

In any alternating-current distribution system it is in the interest of the generating plant that each consumer should have as high a power-factor as possible. But as unity power-factor is a practical impossibility, it has often been proposed as fair and just that the charge for energy consumption should not be for the true energy consumption only, but that the consumer should pay something for the wattless current for which he is responsible. A method of charging on this principle is in use, for instance, in Cleveland, Ohio. Prof. Riccardo Arno of Italy has introduced the term "complex charge," his proposal being to charge for the number of true kilowatt-hours plus a certain fraction of the difference between the apparent and true kilowatt-hours. If this fraction is, for instance, one-third, and $e$ is the voltage and $i$ the current and $\varphi$ the phase difference, the real power is $ei \cos \varphi$, the apparent power $ei$, and the "complex charge" becomes $ei \cos \varphi + 1/3\ (ei - ei \cos \varphi) = 2/3\ ei \cos \varphi + 1/3\ ei$. He measures this charge directly by adjusting the phase difference between voltage flux and current flux in an ordinary Ferraris meter.

In the *Elektrotechnische Zeitschrift* for Sept. 30 R. Stoeppler discusses certain practical disadvantages of this method, while he fully agrees with the fairness of the principle. He proposes to use a double instrument, one meter ($A$) measuring the real power $ei \cos \varphi$, the other meter ($B$) the product $ei \sin \varphi$. In Fig. 1 the voltage vector $e$ and the current vector $i$ form a phase angle $\varphi$, and $i_w = ei \cos \varphi$ and $i_m = ei \sin \varphi$. Let the current coils of these two instruments be connected in series, the voltage coils in parallel; then if the load is non-inductive, the first meter ($A$) will run, the other ($B$) will be at rest. When the load becomes inductive and the reactive component increases, the speed of $A$ will decrease, that of $B$ will increase. For a phase difference of 45 deg. the speeds of $A$ and $B$ will be equal. Now, if one wants to find Arno's "complex charge," $2/3\ ei \cos \varphi + 1/3\ ei$, in the above example, Fig. 2 shows how the indications $ei \cos \varphi$ of meter $A$ and $ei \sin \varphi$ of meter $B$ change with the phase difference $\varphi$. The ordinates are the torques or speeds of the two meters. From the ratio of the reading $B$ to that of $A$ (tang $\varphi$) Fig. 3 permits one to find directly the phase angle $\varphi$, the power-factor cos $\varphi$, and that coefficient by which the reading of meter $A$ must be multiplied in order to find Arno's "complex charge." This coefficient is given in three curves, marked ¼, 1/3 and ½, corresponding to the three cases in which the complex load is defined as the real load plus one-quarter or one-third or one-half times the difference of apparent and real load. For the case 1/3, for instance, if meter $A$ reads 915 and $B$ 3200, we have tang $\varphi = 3200 \div 915 = 3.5$, and from Fig. 3 we find a power-factor of 0.27, a phase difference of 74 deg., and the coefficient 1.88 for determining Arno's complex charge. Hence Arno's complex charge, $915 \times 1.88 = 1720$. That is, while the real load is 915 hours, the charge on the basis of Arno's principle will be 1720 kw.

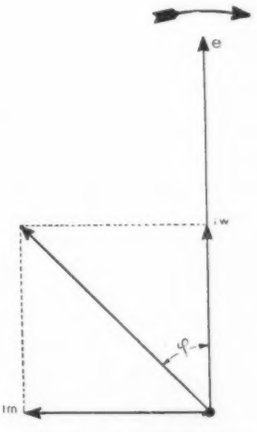



FIG. 1—VOLTAGE AND CURRENT VECTORS

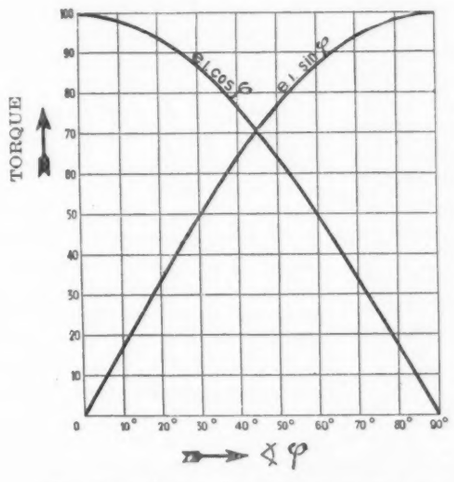



FIG. 2—VALUES OF COEFFICIENTS FOR VARIOUS PHASE DIFFERENCES

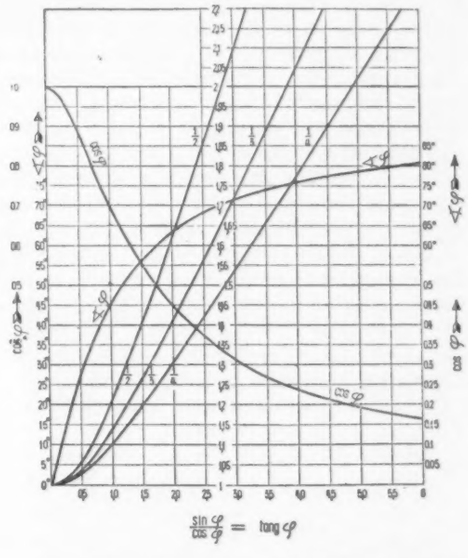



FIG. 3—CURVES OF POWER-FACTOR AND COEFFICIENT TO GIVE "COMPLEX CHARGE"

With this method the ordinary meters now in use for single tariff, double tariff and maximum-demand tariff may be continued in use, and it is only necessary to combine any such meter with an analogous one giving $ei \sin \varphi$. The principle of design of the latter is well known. Mr. Stoeppler's article gives useful information on the connections of such meters on three-phase systems.

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### Generators, Motors and Transformers

*Three-Phase Transformers.*—A. N. AIKMAN.—A paper in which the author discusses the heat and temperature rise of three-phase transformers and the determination of the temperature rise by the increase of the resistance method. He then takes up permissible overload rating and gives results of overload tests of a

500-kva. transformer. He deals with the sludging of the oil, the overhaul of transformers, fire risks, and at some length with the parallel running of three-phase transformers. Some notes on windings in parallel, on the relative advantages of the unsymmetrical core type and the shell type, on unbalancing of the supply system, increased loss on high voltage, and the appearance of the third harmonic in voltage between line and neutral, are discussed.—*Trans. of South African Inst. of Elec. Engrs.*, September, 1915.

*Direct-Current Armature Winding.*—F. Leyerer.—An article illustrated by diagrams on the "chord winding" (short-pitch winding) of direct-current armatures with special reference to armature reaction, brush position, and voltage between segments.—*Elek. Zeit.*, Oct. 7, 1915.

*Alternator with Pure Sine-Wave Emf.*—W. Seemann.—An illustrated translation in abstract of his German paper, noticed some time ago in the Digest, on the method of constructing alternators to obtain a pure sine-wave emf. This is accomplished by altering the magnetic reluctance around the rotor by means of cutting away the periphery of the rotor at the required places.—London *Electrician*, Oct. 29, 1915.

### Installations, Systems and Appliances

*Protection of Transformers Against Dangerous Rises of Voltage.*—Emil Wirz.—Gemecke has recently recommended the use of resistors in parallel with transformers to protect the transformer winding against dangerous rises of voltage and has recommended especially the use of "silit" resistors, since the fact that their resistance decreases rapidly with an increase of the applied voltage makes them, in his opinion, particularly adapted for this purpose. The present author does not agree with this view, and recommends that if resistors in parallel are used, those with a constant resistance should be employed. In cases of particularly frequent and high rises of voltage he recommends the use of a choking coil containing iron in series with the transformer without shunting the transformer, or to shunt the transformer by a resistor but use in series a choking coil without iron, which in this case must be correctly dimensioned with respect to the transformer.—*Elek. Zeit.*, Sept. 2, 1915.

*British Municipal Station Report.*—An account of the annual report of the municipal electricity station of Bradford for the year ended October, 1915. The total number of kilowatt-hours sold was 28,743,718, against 28,004,090 in the preceding year. The increase in power supply has been considerable (almost 500,000 kw.-hr.), and bulk supply agreements have been entered into with a number of consumers varying from 100 kw. up to 1000 kw., or a total of 2900 kw. The load-factor has risen from 26.7 in 1913 and 27.7 in 1914 to 27.9 in 1915. The total cost, including capital charges, was 2.14 cents per kilowatt-hour sold, against 2.20 cents the year before. Since the total revenue was 2.46 cents, there was a surplus balance of 0.23 cent per kilowatt-hour sold. It was fortunate for the Bradford station that contracts for the new plant had been placed and were well in hand before the British government found it necessary to control the outputs of engineering establishments or to adopt a policy of restricting capital expenditure. Even so, the sum which had been provisionally sanctioned in 1914 was somewhat reduced. A new turbo-generator of 5000 kw. is so far completed that preliminary trials of this set have been made.—London *Electrician*, Oct. 29, 1915.

### Electrophysics and Magnetism

*Electromagnetic Induction.*—G. W. O. Howe.—An article illustrated by diagrams discussing several problems on electromagnetic induction such as the question "whether if a cylindrical bar magnet or a solenoid be rotated about its axis its magnetic field will rotate with it," and the other question "whether the induction of electromotive force should be considered as due to the cutting of lines or to the change of flux through a circuit."—London *Electrician*, Nov. 5, 1915.

*Charged Surface Layers Formed on the Electrodes of Vacuum Tubes.*—K. T. Compton and L. W. Ross.—Several years ago it was observed that metals which had been used as cathodes in an X-ray discharge, in the attempt to obtain fresh clean surface, exhibited abnormal and very erratic photoelectric properties, especially very high velocities of the electrons emitted. A later investigation showed that such conditions were due to some sort of surface phenomenon which had the effect of greatly changing the contact difference of potential between the emitting and receiving electrodes and thus exposing the electrons to a strong accelerating or retarding field. Because of the frequent use in research of metallic films sputtered from cathodes and of metals which have been exposed to X-ray discharges it is of practical importance as well as theoretical interest to understand the nature of this surface phenomenon, the cause of its erratic behavior, and the methods by which it may be controlled. The experimental investigation of the authors leads to the following results: The abnormal contact potentials produced on the electrodes by high-potential discharges are due to and exist in insulating films, such as wax or grease, on the surfaces of the electrodes, and are reduced or eliminated by shielding or avoiding all such substances. On insulating films of small viscosity surface charges are produced by convection currents in the film set up by the applied field, even though this field may be too small to produce a vacuum discharge. During a vacuum discharge a charged layer of gaseous ions is deposited on the surface of the insulating film. This charge is of a sign opposite to that of the potential of the electrode during the discharge and is therefore opposite to that produced by convection currents. The apparent contact difference of potential is the resultant of these two effects, whose relative importance depends on the viscosity of the film and the nature of the discharge.—*Phys. Review*, September, 1915.

*Critical Field at a Discharging Point.*—A. M. Tyndall.—It has been shown theoretically by Townsend that if $X$ is the critical field—namely, the field at the start or cessation of discharge—at the surface of a point of radius $a$, at a pressure $p$, then $Xa$ is constant so long as $ap$ is constant. Direct determinations of the critical field by measurement of the mechanical force on a hemispherical point are shown to be in complete agreement with theory. An expression for the critical field as a function of pressure and radius of point, deduced on certain assumptions by Edmunds, is shown to be in reasonable agreement with the experimental values given in this and a previous paper. Further measurements of the field at a point under varying conditions of discharge have been made. The effect of supplying the point with ions of a given sign from an external source is briefly discussed in the light of the theory of collisions.—*Philos. Magazine*, October, 1915.

### Electrochemistry and Batteries

*Electrolytic Coating of Mirrors.*—Large mirrors which are coated with silver by the usual methods require a protecting coating at the back, and instead of a varnish, such as was at one time in common use for this purpose, a copper plating has been used as being more efficacious in protecting the silver against oxidation. The difficulty in applying the copper coating by electrolysis lies in multiplying the number of contacts at the surface so as to have an even distribution of

current, care being necessary not to damage the very delicate silver layer, which is almost infinitesimal (about 0.0005 mm.). A description is given of a method in use in Paris in which the silver mirror is placed horizontally, the copper anodes are bars above the mirror, and current is taken off from the surface of the silver cathode by means of special contact combs of particular design.—London *Electrician*, Oct. 8, 1915.

### Units, Measurements and Instruments

*Highly Sensitive Electrometer.*—A. L. PARSON.—An illustrated description of a new electrometer which can be constructed to have a rating as low as 4 cm. or 5 cm. and which in the model under discussion has a rating of 9 cm. It is of simple construction and operation. Its sensitivity is great enough for the detection of $10^{-4}$ volt, but it has not been made steady enough as yet to detect an isolated potential difference less than about $3 \times 10^{-4}$ volt in practice. It is a modification of the Dolezalek electrometer, which can by means of a mechanical adjustment be made to work in a condition approaching instability. The four quadrants are replaced by four sectors arranged in pairs *AB*, *A'B'*, as in the cut, and the box form of the quadrants is abandoned, the sectors being cut from a single disk of metal 0.5 mm. thick. In the quadrant electrometer the torsion of the quartz fiber is used as a measure of the force on the needle and is the only source of its stability. In the present case, however, the stability of the needle is procured by an automatic disposition of electric forces, and the torsion of the fiber is useful only for balancing any dissymmetry in the electric forces such as may arise from a slightly uneven mounting of the sectors. In the more sensitive adjustments of the instrument, however, this control by the torsion head is very valuable. As regards the electrical connections, the instrument can be used in exactly the same way as the quadrant electrometer, and the needle can be charged either by a constant battery through a conducting suspension or by the simpler method of a charging switch. The chief innovation is that the sectors are mounted on a pair of arms pivoted scissors-like at the center, and that the small gaps between *A* and *B*, *A'* and *B'* can be varied in width from something very small to about 2 mm. by the action of a micrometer screw. When the gap is small and the sectors are at equal potentials, *A* and *B* form a virtually continuous inducing surface opposite the charged needle, and the capacity of the system is highest when the needle hangs symmetrically over them. This, therefore, is its stable position. If a difference of potential is set up between *AA'* and *BB'*, the needle is deflected, at first nearly proportionally to the potential difference, and then less and less as it approaches the large gaps at the sides. This is the least sensitive way of using the instrument, and gives deflections at the rate of about 3 mm. per millivolt (the scale being 5 meters distant). As the gap between *A* and *B* is widened, the needle becomes less and less stable in its central position and the sensitivity greater and greater. Just before instability is reached a stable deflection at the rate of as much as 150 mm. per millivolt can be obtained, but it is probably not worth while working with deflections greater than about 40 mm. per millivolt. —*Phys. Review*, November, 1915.

### Telegraphy, Telephony and Signals

*Mechanical Model of a Telephone Line.*—F. BREISIG.—The analogy between the propagation of mechanical waves in elastic media and of electric waves over transmission or telephone lines is well known. The author describes a mechanical model which permits the demonstration of various phenomena in telephone lines, and he shows that the analogy is very complete. The model consists of rods which are connected together elastically by means of springs. Several applications of this model are described, especially relating to propagation velocity, to the behavior of loading coils, etc.—*Elek. Zeit.*, Oct. 7, 1915.

*Phantom Telephone Circuits.*—An anonymous article illustrated by numerous diagrams in which the advantages and economies of superimposed or "phantom" telephone circuits are discussed. The balancing of existing telephone circuits and the apparatus (repeating coils) required to obtain a successful working of "phantom" circuits are described in some detail.—London *Electrician*, Oct. 22, 1915.

# Book Reviews

MECHANICAL DRAWING FOR COLLEGES AND UNIVERSITIES. By James D. Phillips and Herbert D. Orth. Chicago: Scott, Foresman & Company. 284 pages, 295 illus. Price, $1.75.

The authors present a course in mechanical drawing for college students who have had no previous experience in drawing. The course has been arranged with a view not only of giving the student an appreciation of the best commercial drafting-room practice but also of developing in the student the power of imagination and of co-ordinating the actions of the hands and eyes. Representing as it does the experience of years spent in the teaching of drawing, the book places in the hands of the instructor a course which has been found to fulfill both educational and commercial requirements. The order that is followed in the drafting room has been used by the authors in developing the course: First, perspective sketching; second, orthographic sketching; third, pencil mechanical drawing, and, lastly, tracing and blueprinting. The authors have arranged the course by distributing the introduction of theory and the use of the various instruments so that the student will comprehend both the theory and the application at the same time.

THOMAS' REGISTER OF AMERICAN MANUFACTURERS AND FIRST HANDS IN ALL LINES. New York: Thomas Publishing Company. 3100 pages. Price, $15.

This directory contains a list of 15,000 names of manufacturers in the United States. It covers all lines of manufactured articles—some 70,000 in number. The capital ratings for each name, the A-Z alphabetical list of names and the alphabetical trade-name list are features especially worthy of mention. It will be found a useful reference book by manufacturers in all lines of trade throughout the United States, by city government departments, consuls, exporters and importers, by individual merchants, and, in short, by business men of every description in all parts of the country.

## Books Received

Machine Design. By Albert W. Smith. New York: John Wiley & Sons, Inc. 500 pages, 277 illus. Price, $3.

The Corrosion of Iron. By L. C. Wilson. New York: The Engineering Magazine Company. 178 pages. Price, $2.

Wireless Telegraphy. By Dr. J. Zenneck. Translated from the German by A. E. Seelig. New York: McGraw-Hill Book Company, Inc. 442 pages, 467 illus. Price, $4.

W. N. POLAKOV

**Walter N. Polakov**, who has resigned as superintendent of power for the New York, New Haven & Hartford Railroad, has opened an office as consulting engineer at Stamford, Conn. Mr. Polakov was born in Russia in 1879 and received his engineering education in Germany. For the past fifteen years he has given attention to problems of management of central stations and industrial plants, applying the principles of scientific management to their operation. Mr. Polakov has recently served as consulting engineer for the board of estimate and apportionment, the department of docks and ferries, and the department of electricity of New York City.

**F. J. Rowe** has been appointed superintendent of the electric-lighting system of Social Circle, Ga.

**C. H. Mason**, formerly of Hornell, N. Y., has been appointed manager of the Dansville (N. Y.) Gas & Electric Company, succeeding C. G. McAvoy.

**Gardner J. Menut**, who has been superintendent of the Springfield (Vt.) electric plant, has been appointed assistant to the general manager of the Claremont (Vt.) Power Company. Mr. Menut was formerly employed by the St. Johnsbury (Vt.) Electric Company.

# *Men of the Industry*

Changes in Personnel and Position— Biographical Notes

**Theodore B. Odell** is the new manager of the Rockland Light & Power Company of Nyack, N. Y.

**C. G. McAvoy**, formerly secretary and general superintendent of the Dansville (N. Y.) Gas & Electric Company, has been appointed superintendent of the Hornell Electric Company, Hornell, N. Y.

**W. R. McLeod**, who for the past three and one-half years has been connected with the Pennsylvania Utilities Company, Easton, Pa., in various capacities, has tendered his resignation, to become effective Dec. 1, and will enter the employ of the Public Service Electric Company of Newark, N. J., as industrial power engineer.

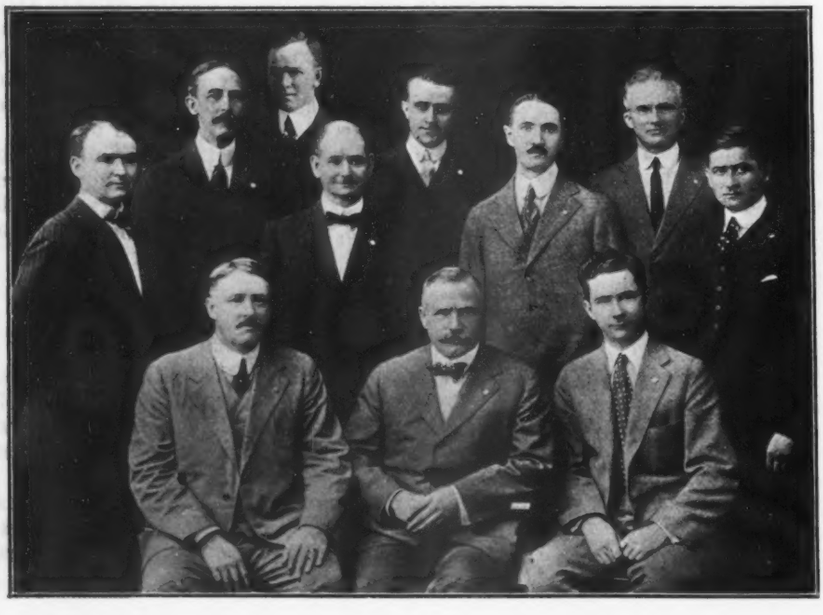
**Harry J. McIntyre**, formerly secretary and treasurer of the Mount Washington Electric Light & Power Company, Mount Washington, Md., and assistant suburban-district manager of the Consolidated Gas, Electric Light & Power Company of Baltimore, has been appointed general sales manager of the Aladdin Lamp Corporation for Maryland, Delaware and the District of Columbia.

**R. L. Baldwin** has resigned as appraisal engineer for the State Utility Commission of Missouri, a position which he has held for two years, and has associated himself with the firm of Burns & McDonnell, consulting engineers of Kansas City, Mo., where he will have charge of electrical work and appraisal of electrical and other utilities for the firm. Mr. Baldwin is a graduate of the Missouri State University and was associated with Burns & McDonnell before.

DR. COLIN G. FINK

**Dr. Colin G. Fink**, the chairman of the New York Section of the American Electrochemical Society, is in charge of the research laboratory of the Edison Lamp Works of the General Electric Company at Harrison, N. J. After graduating from Columbia University in 1903, Dr. Fink went to Germany and there studied under Ostwald, graduating from the University of Leipsic in 1907. Dr. Fink's degree of Ph.D. was received for his thesis on heterogeneous reactions with special reference to the sulphur-trioxide process. Returning to America, he entered the research laboratory of the General Electric Company at Schenectady, where he engaged in work on the tungsten filament and the problem of ductile tungsten, making in May, 1910, in his paper read before the Pittsburgh Section of the American Electrochemical Society, the first announcement of the achievement of ductile tungsten and molybdenum.

**H. W. Brunell** has resigned as power engineer for the Pennsylvania Utilities Company of Easton, Pa., and will hereafter be connected with a large public service company in New York City. Mr. Brunell came to Easton from Oklahoma, where he had served as engineer for H. M. Byllesby &



## Staff of the Society for Electrical Development, Inc.

The accompanying photograph shows the New York office staff of the Society for Electrical Development, Inc., which has been actively connected with the development and execution of plans for the celebration of Electrical Prosperity Week, Nov. 29 to Dec. 4.

Seated in the front row, from left to right, are James P. Mallett of the engineering division; James M. Wakeman, general manager, and H. W. Alexander, director of publicity.

From left to right, standing: John T. Kelly, in charge of the news bureau; Theodore Dwight, in charge of the commercial section; A. J. Edgell, manager of the window-display service bureau; James Smieton, Jr., secretary and treasurer; William W. Ayres, advertising department; John A. Randolph, trade-press editor; C. Ridderhof, manager advertising department, and John J. Reardon, assistant in the news bureau.

Other members of the society's staff, absent from this picture, are Harrison T. Matthew, Pacific Coast representative, and G. B. Muldaur and G. W. Hill, field lecturers.

Company. Mr. Brunell is the inventor of a number of devices which have effected great savings in the operation of electrically driven machinery in the slate belt of Pennsylvania.

**John E. S. Thorpe** has been appointed resident engineer by the Aluminum Company of America for its dam and power house to be constructed on the Yadkin River near Whitney, N. C.

**David M. Bunn,** superintendent of the engineering and construction department of the Appalachian Power Company, Bluefield, W. Va., has been appointed manager of the company's Bluefield division.

**George Derby** has been appointed superintendent of the electrical department of the Lockport Light & Power Company of Lockport, N. Y. Mr. Derby was formerly engineer in charge of the Elm Street power plant.

**Walter F. Abbott,** who for the last six years has been assistant superintendent of the Maine Water Company, has been appointed superintendent of the Bath division of the company, succeeding John C. Humphreys, resigned.

**J. D. Mooney** has been appointed sales manager of the commercial department of the Hyatt Roller Bearing Company, Newark, N. J. Mr. Mooney was formerly in charge of belting sales for the B. F. Goodrich Company, Akron, Ohio.

**A. Press,** formerly chief engineer of the American Transformer Company, Newark, N. J., returned from England, Nov. 11, where for the last two years he has been teaching mathematics. Mr. Press was at one time a designer with the Allis-Chalmers Manufacturing Company at Norwood, Ohio, and afterward served as a member of the faculty of graduate studies of George Washington University, Washington, D. C. He plans to take up educational work in this country.

**Jesse L. Jones,** who was recently elected president of the American Institute of Metals, is chief chemist of the research division of the engineering department of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Mr. Jones is a graduate of Ohio State University and has been connected with the Westinghouse company since 1903.

J. L. JONES

**A. K. Young,** the president of the Industrial Electric Heating Association, which is holding its first regular convention at Detroit, Mich., on Friday and Saturday of this week, is the manager of the commercial department of the Toledo (Ohio) Railways & Light

A. K. YOUNG

Company. Mr. Young's first work in the central-station field was with the Doherty company ten years ago in Cincinnati. Later he was transferred to the Montgomery Light & Water Company at Montgomery, Ala., and from there he went to Bristol, Pa., to the Bristol Gas & Electric Company. Later, in 1911, Mr. Young served as contract agent for the Brush Electric Company of Galveston, Tex., from which position he was called to take charge of the new-business staff of the Toledo Railways & Light Company. In connection with Mr. Young's interest in electric-heating work and in the activities of the new association of which he is president, it may be pointed out that the Toledo company has connected to its lines probably the largest central-station heating customer in the United States, the Willys-Overland Automobile Company, with 11,000 kw. in electric enameling ovens.

**Clarence E. Whitney,** president of the Whitney Manufacturing Company, has been appointed a member of the Board of Directors of the Hartford (Conn.) Electric Light Company.

**Emerson McMillan,** chairman of the board of the American Light & Traction Company, New York City, has also been elected chairman of the executive committee of the company, succeeding the late Gen. Thomas Hubbard, and Frank S. Smith has been elected a member of the executive committee to fill the vacancy caused in that body because of the death of General Hubbard.

**E. L. Benton,** superintendent of the Lockport (N. Y.) Light & Power Company, has invented a device for the explosion of shrapnel cartridges and has disposed of his patent rights to one of the warring nations of Europe. Mr. Benton may go to Europe to engage in the manufacture of the caps. Mr. Benton was formerly superintendent of the Citizens' Light & Power Company of Colorado Springs, Col.

# Obituary

**George Seward Baker,** who in 1914 was appointed general manager of the Chattanooga & Tennessee River Power Company, succeeding Byron C. Burt, with headquarters at Chattanooga, Tenn., died at Chattanooga Nov. 10 as the result, it is understood, of blood poisoning from a minor operation. Mr. Baker was a native of Portland, Me., and was for eight years employed by the New York Edison Company of New York City.

**Herbert M. Wheeler,** engineer in charge of electrolysis and electrical distribution for the Chicago Surface Lines, died suddenly Nov. 12, 1915, from a blood lesion on the brain which developed while he was at the military training camp at Fort Sheridan. Mr. Wheeler was born at Shawano, Wis., in 1876, and following his graduation in electrical engineering at the University of Minnesota in 1896, he was employed by the Fort Wayne (Ind.) Electric Corporation. His career as electrical engineer in street-railway work began in 1899 with the North Chicago Street Railroad, where he served as an assistant engineer. Four years later he resigned to become instructor in mathematics and engineering at Lewis Institute, Chicago, and in 1907 he again returned to railway work, becoming connected with the Chicago Railway as electrical engineer.

**P. E. Huber,** one of the founders of the Oerlikon Works in Switzerland, died at Zurich, Oct. 4, at the age of seventy-nine. He was a native of Zurich and received his education in the local Polytechnic High School, of which Alfred Escher was at the time president. After practical experience with the Sulzer firm in Winterthur and with Escher, Wyss & Company in Zurich, Huber in 1863 founded the firm of P. E. Huber & Company at Oerlikon, which, after various changes, in 1876 took the form of the Maschinenfabrik Oerlikon. Huber continued to be the active director in charge until 1894, and from then until 1911 remained as president of the advisory council of the firm, of which he was a member at the time of his death. He also served as president of the Aluminum-Industrie A. G., Neuhausen.

P. E. HUBER

# New Apparatus and Appliances

*A Record of Latest Developments and Improvements in Manufacturers' Products Used in the Electrical Industry*

## Recent Developments in Electrically Operated Toys

One of the outstanding features of the latest electric toys is their excellent construction. They are built to last and to withstand the roughest usage imposed upon them by their sturdy young owners. Improvements in recent years in the design of various accessories, particularly transformers and rheostats, have also greatly increased the flexibility and practical value of the toys themselves.

Thoughtful parents are more and more turning favorable attention to providing electrically operated toys for their boys and girls, for such toys not

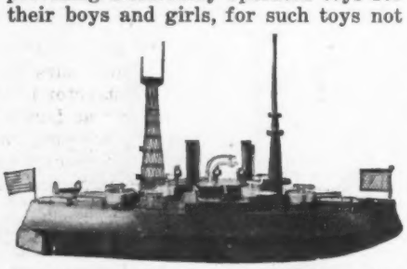


FIG. 1—ELECTRICAL BATTLESHIP, PATTERNED AFTER U. S. S. OREGON

only entertain but also arouse in the youngsters an interest in the fundamental principles of electricity. In fact, some of these electric toys might well be used in elementary laboratories for purely instructional purposes. Many of the manufacturers are employing such care in making their miniature trains, boats, aeroplanes, etc., exact copies of the originals that frequently the models have been utilized in classrooms.

The business in electric toys in this country is growing very rapidly. The increase each year is said to be about 50 per cent. New toy-manufacturing companies are being formed continually, and the older companies are increasing the size of their plants. With the cessation of imports from Germany and Austria, American concerns are offering substitutes not only as good as the foreign product but in many cases of better quality, and at lower prices.

Various manufacturers have been especially active in developing new types of toy transformers. In Figs. 5, 6 and 7 are shown transformers made by the Viking Electric Company, 150 Chambers Street, New York. The first two types are designed for use with toy motors operating on alternating current. Each type is equipped with a lever for providing various potentials, the former having a range of from 2

FIG. 2—ELECTRIC MOTORBOAT MODEL

volts to 17 volts and the latter of from 5.5 volts to 10 volts. The third type of transformer, shown in Fig. 7, has been designed for use with the toy motor shown in Fig. 15.

In Fig. 9 is shown a toy transformer brought out by the Fort Wayne Electric Works of the General Electric Company, Fort Wayne, Ind., which is designed to withstand rough usage and to be thoroughly safe in the hands of children. It is being made in two sizes with ratings of 50 watts and 100 watts. The device is equipped with a radial switch, by means of which ten different secondary voltages can be obtained. It is finished in black with bronze switch mechanism. Fig. 8 illustrates what is described as a 6-volt or terminal-type transformer, which is designed for operating the smaller class of toys. The instrument is rated at 50 watts. It is housed in a cast-iron cover and is equipped with 9 ft. of flexible cord and an attachment plug. Fig. 11 illustrates the master-lever type of toy transformer, which has a potential range of from 0 volt to 30 volts, the change in voltage being accomplished by shifting the lever from contact to contact. The transformer is also provided with a tap for providing energy at 6 volts for operating miniature lamps while the instrument is being used to operate electrical toys. The cover is of blue-glazed porcelain and is equipped with nickeled hardware. The body is constructed of an aluminum fitting, and the base of a malleable-iron spider casting. The device is rated at 125 watts and is being designed for various commercial frequencies and voltages. The two latter-named transformers are being made by the Packard Electric Company, Warren, Ohio.

The toy transformer shown in Fig. 10 is being made by the Lionel Manufacturing Company, 48 East Twenty-first Street, New York. The device has been designed particularly for use with the company's electric trains and other outfits, but may also be employed with annunciators, bells, burglar alarms, wireless apparatus, etc. The coils are inclosed in an insulating compound so that the transformer is impervious to the effects of heat, air, oil or water. It is inclosed in a steel case finished in black enamel and provided with a brass plate giving the index of the voltages obtainable. All other metal parts are nickel-plated and polished. The cord entrance is protected with a porcelain ring. The device is designed to give

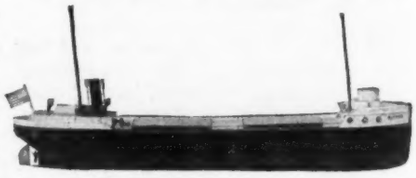


FIG. 3—ELECTRIC LAKE FREIGHTER IN MINIATURE

pressures in 1.5-volt steps from 1.5 volts to 24 volts.

### Toy Motors

Among the recent developments in low-voltage toy motors several interesting types are shown herewith. In Fig. 15 is illustrated a low-voltage toy motor of the Universal type made by the Viking Electric Company, 150 Chambers Street, New York. The machine operates on alternating current at a pressure ranging from 4 volts to 6 volts, energy being taken from an ordinary 110-volt lighting circuit, the pressure being reduced by means of a special transformer which is shown in Fig. 7. The "Veco" motor, as it is called, may also be operated on two ordinary dry cells. The motor is provided with removable pole pieces and detachable cast-iron base. The armature core is of high-grade steel laminations. Being of the three-pole type, the motor is designed to start without assistance when the circuit is closed. The brushes are of phosphor bronze and are made two-ply to allow for wear. The shaft is ⅛ in. in diameter and is equipped with a grooved pulley to drive small models, mechanical toys, etc. A

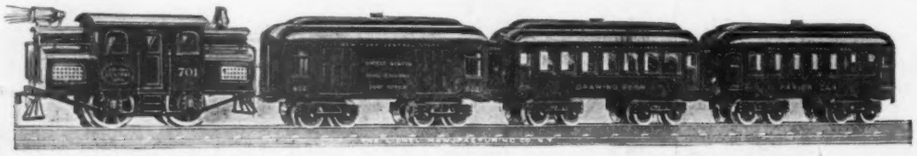


FIG. 4—ELECTRIC TRAIN WHICH OPERATES ON OVAL TRACK 39 IN. LONG

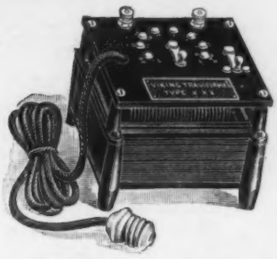


FIG. 5—TRANSFORMER WITH LARGE VOLTAGE RANGE

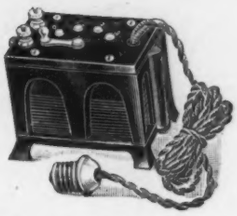


FIG. 6 — TRANSFORMER WITH PRESSURE RANGE OF FROM 5.5 VOLTS TO 10 VOLTS

FIG. 7—TOY-MOTOR TRANSFORMER

FIG. 8—FIXED-VOLTAGE TYPE OF TOY TRANSFORMER

starting switch is provided on the front hood. The motor is finished in black enamel with nickel-plated trimmings.

Another motor made by the Lionel Manufacturing Company, 48 East Twenty-first Street, New York, is shown in Fig. 12. It is designed to operate on one or two dry cells and is provided with three speeds. It is equipped with two pulleys, a drum with triple-reduction gear and a reversing controller.

is illustrated in Fig. 17. The motor operates at three different speeds. The gears are cut from solid metal, and the manufacturer points out that they run smoothly. The commutator is provided with heavy hard-copper segments which are carefully insulated with mica. The machine operates on from 3 volts to 5 volts. It weighs 1 lb. complete and is 3.25 in. high. Black-enamel finish with nickel trimmings is employed on this machine, which is being placed on the

insuring free circulation and consequently rapid cooling. The steel base is enameled and other parts are nickel-plated. The rheostat is 5 in. long, 2.5 in. wide and 1 in. high.

The Knapp Electric Novelty Company has also developed a new rheostat, which is shown in Fig. 20. It is designed to regulate the current of battery motors, wireless sets, electroplating apparatus, etc. The scale is graduated to 0.5 ohm, but the actual

FIG. 9—TRANSFORMER WITH DIFFERENT SECONDARY VOLTAGES

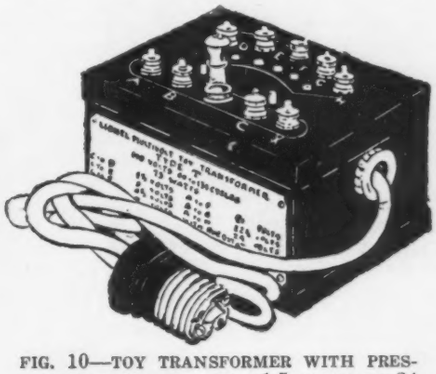


FIG. 10—TOY TRANSFORMER WITH PRESSURE RANGE OF FROM 1.5 VOLTS TO 24 VOLTS

FIG. 11 — TOY TRANSFORMER WITH PRESSURE RANGE UP TO 30 VOLTS

A five-speed motor which operates on one or two dry cells, weighing 1.5 lb. complete, is shown in Fig. 16. The motor is equipped with two gears and small pinions with seven-to-one reduction. A starting and reversing switch is also provided. The outfit is especially adapted for use with toys built up from structural-steel outfits and other mechanical devices. The motor is being placed on the market by the Knapp Electric & Novelty Company, 511 West Fifty-first Street, New York.

Another battery-operated motor provided with starting, stopping and reversing switch and speed reduction gear market by the Kendrick & Davis Company, Lebanon, N. H.

### Rheostat for Use with Batteries

A battery rheostat for use with dry or storage batteries is illustrated in Fig. 19, and has been developed by the Lionel Manufacturing Company, particularly for increasing or decreasing the speed of its toy trains, motors, etc. It consists essentially of a porcelain tube wound with a small resistance wire and mounted on a steel frame. A sliding finger is provided for increasing or decreasing the speed of the trains. The coil is entirely exposed to the air, variation on the slide is less. The high-resistance wire is wound on a porcelain tube. The tube is 4 in. by 0.75 in and is mounted on a base 5.5 in. by 2.375 in. The rheostat weighs 10 oz. It is designed for a total resistance of 15 ohms and has a maximum rating of 3 amp.

Another piece of apparatus brought out by the Knapp company especially for use by children, and which is particularly attractive on account of its educational features, is the electromagnet illustrated in Fig. 22. It consists of a U-shaped magnet yoke 0.25 in. in diameter with two coils, 1.25 in. by 0.75 in., each of which is wound so as to have a resistance of 5 ohms. The total weight of the magnet is 6 oz.

With the idea of educating young

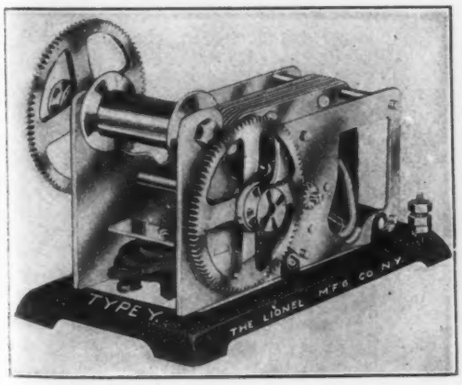



FIG. 12—BATTERY-OPERATED TOY MOTOR

FIG. 13—"TEDDY BEAR" WITH ELECTRIC EYES

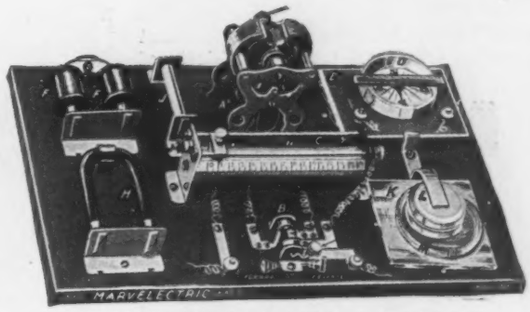



FIG. 14—ELECTRICAL SET FOR EDUCATING CHILDREN

FIG. 15 — UNIVERSAL-TYPE TOY MOTOR

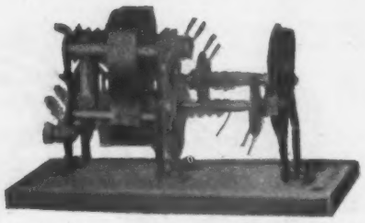


FIG. 16—FIVE-SPEED BATTERY MOTOR

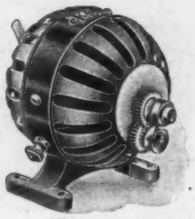


FIG. 17 — THREE-SPEED BATTERY MOTOR

FIG. 18—WIRELESS TRANSFORMER WITH KEY SWITCH

persons in the principles of electricity and at the same time providing amusement, an interesting electrical set or experimental laboratory, as it is called, has been developed. The outfit, which is shown in Fig. 14, consists of a small motor, a switch for reversing and start-

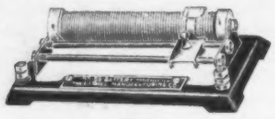


FIG. 19—BATTERY RHEOSTAT

ing, a 15-ohm resistance coil, a pair of electromagnets, a permanent magnet, a galvanometer with compass, a box of iron filings and a dry cell. A book of instructions with many drawings and directions is provided with the set. It takes up the subject of motors and dynamos, windings and connections, the reversing of the direction of current, the effect of resistance on the speed and power, magnets, both permanent and

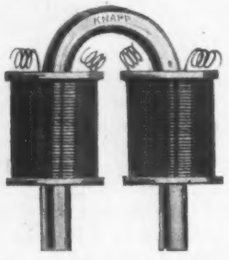



FIG. 22—U-SHAPED ELECTROMAGNET

electro, their lifting power and other uses, and the magnetic curves demonstrated by iron filings on glass; resistance and electrical measurements, the action of the solenoid, etc. The outfit is mounted on a handsomely finished base, 11 in. by 7 in., with holders for the different appliances. It is being placed on the market by the Knapp Electric & Novelty Company, 511 West Fifty-first Street, New York.

### Miniature Electric Trains

Of all the numerous electric toys, the small electric trains are among the most popular, serving not only as objects of wonderment in the nursery and playroom, but as features of every complete electric toy display. The Lionel Manufacturing Company, 48 East Twenty-first Street, New York, which

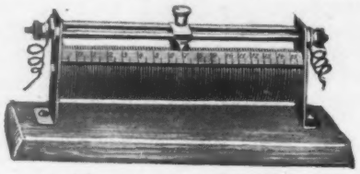


FIG. 20—REGULATING RHEOSTAT

specializes in the manufacture of electric trains, has brought out the train shown in Fig. 4. This is an exact replica in miniature of a New York Central train, comprising an electric locomotive, a mail car and two Pullman cars. The train operates on a curved track formed of eight sections, making an oval 39 in. long. Included in the outfit is a controlling rheostat. The train runs in one direction only and is 31.5 in. long. The cars and locomotives are of stamped steel and may be

FIG. 23—ELECTRIC TOP

dropped on the floor, it is claimed, without being injured. Various types of these electric trains are being made. Some are patterned after steam railroad trains. Some of the trains can be moved forward or backward if desired. Illumination is provided by miniature lamps, the various accessories including electrically lighted semaphores, lamp-posts, etc.

### Electric Top

An interesting novelty in the form of an electric top is shown in Fig. 23. Four color disks are provided, with which beautiful color effects can be obtained by slightly pressing the finger against the edge of the disk or on the wooden handle shown in the illustration. The device may also be employed as a

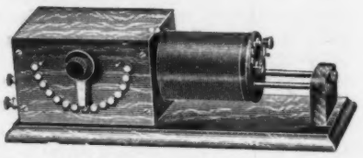


FIG. 21 — WIRELESS RECEIVING TRANSFORMER

motor for operating small mechanical toys. It is finished in red enamel with polished nickel trimmings and operates on one dry cell. The electric top is being made by the Kendrick & Davis Company, Lebanon, N. H.

### "Teddy Bear"

Another interesting novelty which will appeal especially to the small girl

FIG. 24—ROTARY SPARK-GAP

is the "Teddy bear" shown in Fig. 13. This toy has eyes that "flash." The eyes are lighted by a battery inside the toy which can easily be removed by unfastening two glove buttons in the back of the bear. The bulbs which form the eyes can also be readily removed by simply unscrewing the old bulbs and putting in the new ones. The "Teddy bear" is made in brown, black and white. The brown bears are provided with green eyes, the black with red, and the white with pink eyes. The toy is being placed on the market by the Interstate Electric Novelty Company, 49 Park Place, New York.

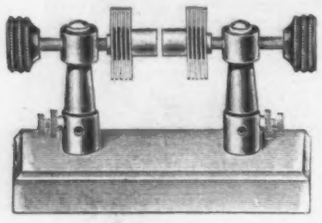


FIG. 25—SPARK-GAP

FIG. 26—ROTARY VARIABLE CONDUCTOR

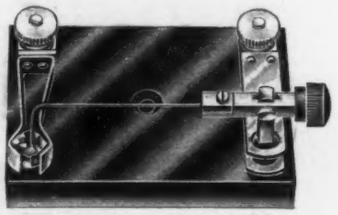


FIG. 27—CRYSTAL DETECTOR HOLDER

### Wireless-Telegraph Apparatus

Boys who are equipped with an inventive mind naturally turn to wireless apparatus. The J. H. Bunnell & Company, 32 Park Place, New York, has recently brought out several new devices for amateur wireless outfits. Included among these is a receiving transformer (Fig. 21), which has fifteen taps brought out to contact points mounted on the side of the primary cabinet and controlled by a quick-acting radial switch. The secondary coil of the "Jove" receiving transformer, as it is called, is provided with six taps brought out to contact points on the end of the drum and controlled by a quick-acting, self-adjusting spring-type lever. The transformer is 14 in. long by 5.5 in. wide by 4.5 in. high.

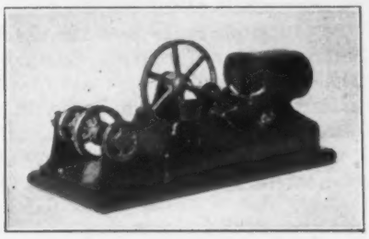


FIG. 28—ELECTRIC TOY "STEAM ENGINE"

In Fig. 24 is shown a "Mascot" rotary spark-gap. The rotary wheel is of one piece of polished hard rubber and 6 in. in diameter, with a circular brass border on which twelve zinc electrodes are mounted. The standards are of highly polished brass 3⅛ in. high, having concealed springs for making rapid and permanent adjustments. Insulated handles are of hard rubber. The "Jove" spark-gap, shown in Fig. 25 is provided with 0.5-in. electrodes, each of which is equipped with five 1.25-in. radiators. The uprights are equipped with metal buttons on the top for controlling concealed springs. The base is of glazed porcelain. In Fig. 27 is shown a "Jove" crystal detector holder, the base of which is of porcelain with black glaze finish. In Fig. 26 is shown a "Beeko" rotary variable condenser, which is inclosed in a hard-drawn dust-proof brass case with black-rubber finish. It consists of twenty-one movable and twenty-two stationary aluminum plates. When mounted in a horizontal position the rotary will remain set at any point without the use of balancing weights. The size over all is 3.75 in. by 4.25 in.

The Viking Electric Company, 150 Chambers Street, New York, has also just brought out a transformer for wireless sets which is being made in sizes rated at 1 kw., 0.5 kw. and 0.25 kw., giving voltages of 1000 volts, 1300 volts and 2000 volts. The device, which is shown in Fig. 18, is provided with a three-point key switch that cannot be taken out when the circuit is closed. It is equipped with glass feet and a safety gap so that in case of trouble with the condenser a charge will take place across the gap and thereby save the transformer coils.

### Electric Engines and Boats

The Menominee Electric Manufacturing Company, Menominee, Mich., is making the devices shown in Figs. 28 and 29, which are modeled after modern steam engines of the horizontal and vertical types. They consist merely of an electromagnet with the armature connected to a crankshaft. They are constructed with a heavy cast-iron frame enameled bright red. Each engine is reversible. Counter shafts are provided to drive hoists and derricks.

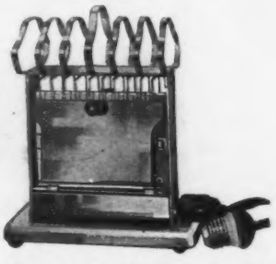
The Rose Manufacturing Company, Rockefeller Building, Cleveland, Ohio, is making what it calls the "Yankee fleet" electrically propelled boats, models of a motorboat, trawler or lake freighter and battleship being shown in Figs. 1, 2 and 3. The motors are operated on one or two dry cells. By setting the rudders the boats may be propelled in any direction desired. The boats are of well-seasoned white pine and are finished in oil paint of various colors. The motorboat model is 36 in. long, 5.75 in. wide and has a draft of 15 in. It is equipped with a removable canopy top. The ocean trawler or lake freighter is patterned after a typical freighter and will carry a cargo. It is 36 in. long, 5.75 in. wide and has a draft of 2 in. The battleship is modeled after the famous U. S. S. Oregon and is provided with movable turrets and guns and operated by twin screws. The length of the battleship is 36 in., the width 9.7 in., and the draft 25 in.

FIG. 29—ELECTRIC "STEAM ENGINE" WITH OVERHEAD SHAFT

## Electric Toaster with Rack for Drying Bread and Keeping Toast Warm

A new toaster just brought out by the Simplex Electric Heating Company of Cambridge, Mass., is designed to toast two large or four small slices at one time. In the toasting operation crumbs do not get on the table but drop to the nickeled base, from which they may be easily removed. The device is of steel which is copper-plated with nickel finish, and it is equipped with a rack for drying bread and keeping toast hot. A wooden handle is attached to each of the doors so as to make it convenient and easy to turn or remove the toast without burning one's fingers.

The toaster described in this article is equipped with a lamp-socket plug, a cord, and a detachable connector, and is rated at 450 watts.



ELECTRIC TOASTER FOR PREPARING TWO SLICES AT A TIME

## Electric Radiant Heater

A portable electric radiant heater with polished-copper reflector and handle for carrying it from place to place is shown in the accompanying illustration. The device is of steel finished in old bronze and weighs only 4 lb. When the circuit is closed, individual glower units of the button type give the appearance of a glowing bed of live coals. The device is provided with a detachable plug, 8 ft. of brown silk cord, and a lamp-socket attachment plug. Uses to which the heater may be put, as suggested by the manufacturer, the American Electrical Heater Company, Detroit, Mich., are heating bathrooms, nurseries, automobiles, exposed offices for ticket sellers, small living-rooms, etc. The heater is rated at 600 watts and is 8 in. deep, 16 in. wide and 11 in. high.

600-WATT RADIATOR HEATER WITH BUTTON-TYPE ELEMENTS

### Electric Iron with Heat Intensified at Point

The Rochester Stamping Company, Rochester, N. Y., has just brought out an electrically operated iron with its heating element so designed that the heat developed is more intense at the point than in any other portion of the iron, enabling one to iron up into tucks and folds

ELECTRIC IRON WITH ATTACHED STAND

and over damp clothes without the iron becoming cold at the tip. The heating element is so insulated that the top of the iron, the manufacturer points out, is always cool. An attached stand is provided which enables one to tip the iron back when not in use, instead of lifting it on and off a detached stand.

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### Self-Contained Unit for Indirect and Semi-Indirect Lighting

A number of different types of ornamental fixtures for indirect and semi-indirect lighting, several of which are shown in the accompanying illustrations, are being placed on the market by the Mohrlite Company, Urbana, Ohio. Each unit consists essentially of a diffusing reflector which projects the light upon a cone-shaped diffusing surface. This surface forms the upper part of the fixture, which is attached to the ceiling. Its curves and reflecting surface are designed to distribute an even illumination over a wide area, at the same time directing sufficient light to the ceiling and side walls to bring them out properly. The units can be so arranged as to lend themselves in character and design to interior decorating schemes, or they may embody some distinctive decorative feature of their own. The color of light may be easily controlled by tinting the reflecting surface, or where special effects are desired, a thin gelatine screen can be dropped over the lamps, causing the entire surface of the fixture to produce a glow of the desired color.

The unit shown in Fig. 1 has been designed chiefly for commercial purposes, being suitable for use in assembly halls, auditoriums, art galleries, banks, etc. It is built in sizes ranging in depth of from 12 in. to 23 in. and with the diameters of the top ranging from 15 in. to 31.5 in. Lamps with a rating of from 15 watts to 500 watts are used with the fixture. The unit illustrated in Fig. 2 is of Pompeian design and is particularly well suited for dining-rooms, Pompeian courts, libraries and art galleries. It is 23 in. deep, with a diameter of the top of 44 in., and is equipped with six lamps with ratings of from 100 watts to 150 watts. A unit which may be employed for semi-indirect or indirect lighting is illustrated in Fig. 3. It is highly ornamental and is especially designed for residences, clubs, apartments, etc. The lower bowl may be made of white glass or of an opaque reflector. The fixture is 15 in. deep and the diameter of the top is 24.5 in. Three and four lights with ratings of 15 watts to 60 watts are employed with the unit.

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### Electrically-Operated Hot-Plates

For use in hotels, restaurants, cafés and residences the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently added several types of electric hot-plates similar to those shown herewith to its line of heating devices. It is claimed that no special utensils are needed with the hot-plates as they are equipped with radiant heaters with all the heat at the

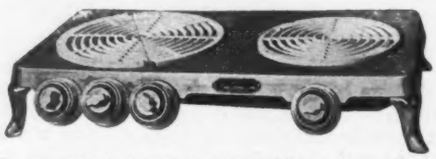
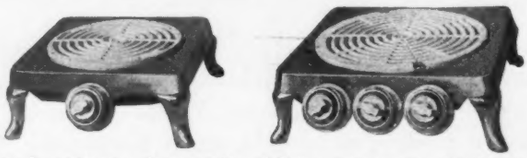


FIG. 1—COMBINED UNIT WITH 10-IN. AND 8-IN. HOT-PLATES

top and are very efficient with ordinary cooking vessels. The hot-plates are made in the 8-in. and 10-in. sizes or the two types are combined in one unit, as shown in Fig. 1. The 8-in. heater switches have four positions, for high heat, medium heat, low heat and "off" or no heat. No energy is wasted at any heat, the manufacturer asserts, the connections being such as to utilize all the energy consumed and to produce uniform heating. In the 10-in. heater three separate switches are employed by means of which an area 6 in., 8 in. or 10 in.



FIGS. 2 AND 3—8-IN. AND 10-IN. ELECTRIC HOT-PLATES

in diameter may be illuminated. Non-corrosive material is used for the heating elements, and water or food spilled over the heater will not damage it. The porcelain brick on which the heating element is assembled is designed to withstand rough usage. Deflector plates below the heaters prevent scorching the table, protect the connections and increase the efficiency of the heater.

FIGS. 1, 2 AND 3—COMMERCIAL SEMI-INDIRECT UNIT, ORNAMENTAL INDIRECT-LIGHTING FIXTURE OF POMPEIAN DESIGN, AND UNIT FOR EITHER INDIRECT OR SEMI-INDIRECT LIGHTING

## Hospital Signal-Lighting System

The lighting system of a modern hospital is usually controlled from one or more distributing panelboards on each floor. Branch circuits from these panels are run to the various rooms, and the lighting of each room is controlled by a switch in the side wall. Separable flush receptacles are installed in each room as outlets for fans, heating pads, reading lamps and other portable electric objects.

Herewith is shown a diagram of a simple system which utilizes the standard circuits and is installed so that an indicating signal can be readily given by the patient. A green lamp is placed over the door inside the patient's room, and over the door outside the patient's room a red lamp is installed. Inside the nurses' room is a red lamp for each patient's room, and a pendent switch is placed in a convenient location and within easy reach of the patient. The switch is connected in series with the line through a flush receptacle of the separable type.

When desiring to call a nurse, the patient pushes the switch button, which lights the lamps inside and outside of the patient's door and the lamp in the nurses' room.

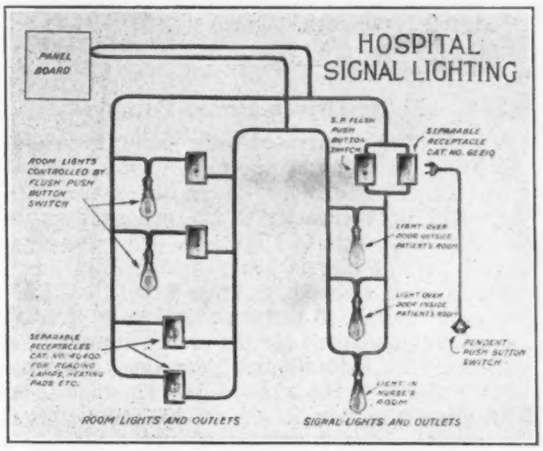



DIAGRAM SHOWING SYSTEM OF SIGNAL LAMPS FOR A HOSPITAL

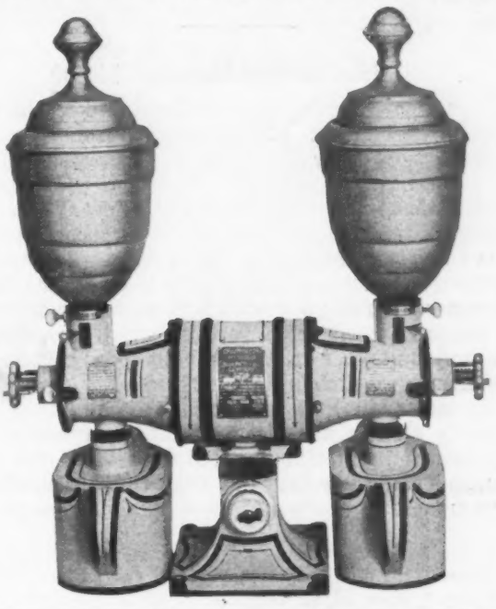
The lamps will burn until the nurse visits the patient and turns them off at the pendent switch. In addition to the pendent-switch control, the system may also be operated by a push-button switch installed in the side wall.

If desired, a single button lock-type push-button switch can be employed. This switch when operated by the patient is locked in the "on" position, and it is necessary for the nurse to use a key to turn off the lamps.

The system has been developed by the General Electric Company, Schenectady, N. Y.

## Electric Coffee Mill

The motor-driven coffee mill illustrated herewith is designed to granulate from 1 lb. to 2 lb. and to pulverize from 0.25 lb. to 0.5 lb. of coffee per minute, depending upon the condition of the coffee. The capacity of each hopper is about 3 lb. The mill, the hoppers and the receiving cans are completely inclosed, preventing dirt from accumulating inside. A positive pin release is provided so as to prevent damage to the mill should a nail or other foreign matter get into the burrs. A dial indicator is provided on the regulator on each end of the mill by means of which the degree of fineness of granulating or pulverizing can be regulated even while the machine is running. The machine is self-cleaning, it is declared; that is, for every pound of coffee placed in the hopper a pound of granulated or pulverized coffee is delivered to the receiving cans. As a protection to curious persons, especially children, wire gauze is placed in the spouts which lead to the receiving can, thus preventing any-

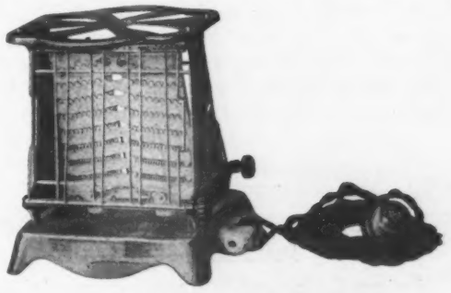


MOTOR-DRIVEN MILL FOR GRINDING AND PULVERIZING COFFEE

one from getting his fingers into the working parts. The device is so arranged that coffee can be granulated and pulverized at the same time. The machine is finished in red with black and gold striping. The hoppers are of brass which is nickel-plated. A ⅛-hp. repulsion induction-type single-phase motor, manufactured by the Century Electric Company, St. Louis, Mo., is utilized to operate the coffee mill. Ten feet of cord and a plug are employed so that the machine can be connected to any ordinary lighting socket.

## A Toaster with Device for Turning the Toast

A recent addition to the line of electric utensils being placed on the market by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., is the "turnover" toaster shown in the accompanying illustration. By turning the knob near the bottom the



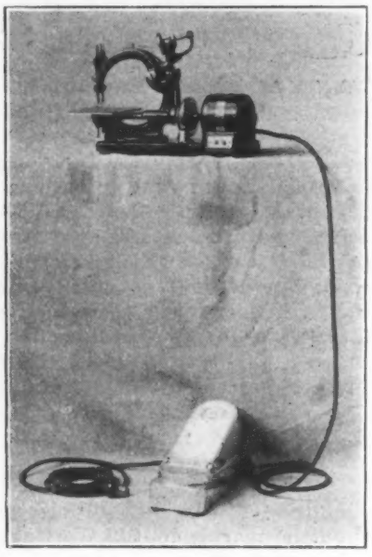
"TURNOVER" TOASTER

frame is thrown outward, while wire catches at the bottom trip the toast in such a way that it slides along the frame, browned side down. On turning the knob back again the toast is raised to a vertical position with the fresh side toward the heater. The heating element consists of a continuous coil of resistance

wire wound on a porcelain plate. The resistance is so distributed as to produce uniform heating, taking into account the variation in heating effect caused by the vertical position of the heater. The device is nickel-plated and highly polished and has a shelf for warming plates or keeping toast or coffee hot.

## Electric Sewing-Machine Motor

A new type of motor has been developed by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., for use with the portable domestic sewing machine made by the Wilcox & Gibbs Sewing Machine Company, 658 Broadway, New York. The motor is directly connected to the machine shaft, as shown in the accompanying illustration. The speed of the motor, and hence of the needle, is under the control of the operator from a special foot pedal. In this pedal is a specially constructed resistor which has virtually an unlimited number of steps, giving speed control from one stitch at a time up to 1800 stitches per minute. As the latter speed is higher than is practicable, an adjustable stop is provided so that the operator may easily adjust the maximum speed to suit her own taste. The manufacturer points out that the acceleration is always smooth regardless of what speed is desired, and



SMALL MOTOR DIRECTLY CONNECTED TO PORTABLE SEWING MACHINE

that there is no jerking or breaking of threads. No brake is necessary because the motor quickly comes to a stop, since the large flywheel required with foot power is not included in the apparatus. The motor is of the compensator universal type, permitting it to be used on any 110-volt circuit, whether of 25 cycles, 60 cycles or 133 cycles.

## Semi-Indirect-Lighting Unit for Commercial Installations

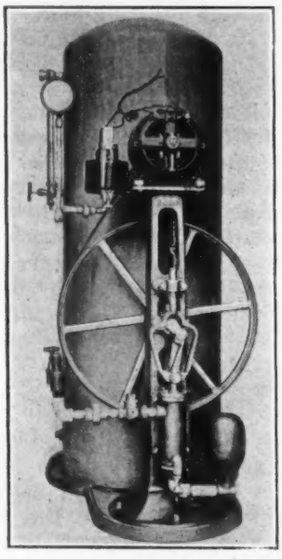
A unit designed for semi-indirect commercial lighting, consisting of an enameled reflector which fits on a 2.25-in. or 3.25-in. shade holder, a translucent glass shade, and an attachment which connects the shade to the reflector by means of wing nuts that may be adjusted to bring the shade nearer or farther away from the reflector, is shown herewith. The "Simplexlite," as the device is called, is made in four sizes, for lamps varying in rating from 60 watts to 500 watts. The units can be attached to any pendent or rigid fixture merely by removing the old shade and attaching the fixture in its place. The wing-nut adjustment may also be used to make the fixture conform with different types of lamps. A 12-in. reflector is employed for lamps with ratings of 60 watts to 100 watts, a 14-in. reflector for lamps

COMMERCIAL SEMI-INDIRECT-LIGHTING UNIT

with ratings of from 100 watts to 200 watts, a 16-in. reflector for lamps with ratings of from 200 watts to 300 watts, and an 18-in. reflector for lamps with ratings of 300 watts to 500 watts. The fixture is being placed on the market by the Simplexlite Company, 138 West 116th Street, New York.

## Motor-Driven House Pump

A new electrically operated water pump for residence service being marketed by the Columbiana Pump Company of Columbiana, Ohio, is of the double-acting cylinder type and has a capacity of 125 gal. per hour when operating at 120 r.p.m. to 135 r.p.m. The plunger is of brass and the cylinder is brass-lined, minimizing corrosion, and, it is claimed, insuring long life. The air intake can be regulated to take any desired proportion of air and water at each stroke, or the air can be shut off entirely. To insure quiet operation, the vacuum chamber is placed on the intake side. The tank is being made in sizes of either 52 gal. or 100 gal. It is electrically welded, heavily galvanized and absolutely air-

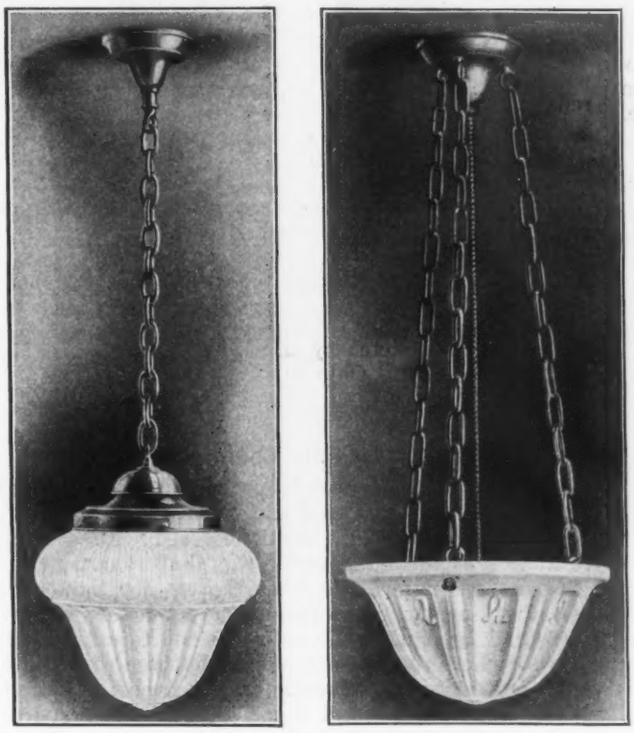


ELECTRICALLY OPERATED PUMP FOR RESIDENCE SERVICE

tight and rust-proof. A Westinghouse 1/6 hp. motor of the CA alternating-current or CD direct-current type is used to operate the pump. A spring idler maintains the flat belt at the proper tension at all times and insures quiet operation. Automatic switches can be set to start and stop the motor at predetermined pressures.

## Glass Fixtures for Gas-Filled Lamps

Monax glass is a light-weight, heat-resisting material utilized to make globes and bowls for gas-filled lamps. The glass withstands high temperatures, it is claimed, in spite of the fact that it is extremely light, weighing from one-third to one-half as much as "opal" or "cased" glass. The lightness in weight is a very desirable feature, as it is obviously easier to handle a light globe than a heavy one. It is not necessary to sand-blast either the inside or the outside of the bowls or globes made of Monax glass, thereby eliminating a possibility of weakening the glass and of providing a means for collecting dirt easily. By blowing the glass very thin the amount of light which is absorbed is reduced to a minimum. All globes and bowls made of Monax glass-



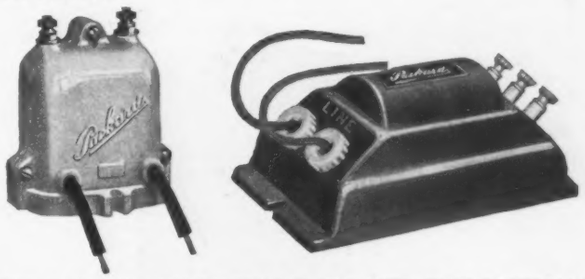
FIGS. 1 AND 2—LIGHTING FIXTURES WITH SPECIAL GLASS FOR GAS-FILLED LAMPS

ware are ventilated for use with gas-filled lamps. Monax glassware is being employed by the Macbeth-Evans Glass Company, Pittsburgh, Pa., with its "Ajax" lighting equipment.

## Miniature Transformers

An interesting line of small transformers has recently been placed on the market by the Packard Electric Company, Warren, Ohio. The transformer shown in Fig. 1 is designed for operating door bells, door openers, buzzers, annunciators and all classes of small signaling devices. These transformers are very small in size, light in weight, and are designed to take the place of dry batteries. When once connected to an alternating-current lighting circuit of the proper voltage and frequency, they are practically indestructible, the manufacturer claims, and will last a lifetime.

The instrument shown in Fig. 2 is of the heavy-duty bell-ringing type and is adapted for use in ringing large gongs in schoolhouses, factories, etc. The device is of similar design to that shown in Fig. 1, with the exception that the case is of cast iron and is designed to provide three voltages (6 volts, 12 volts and 18 volts), which makes it very flexible, it is claimed, for operating bells installed on long or short circuits. The transformer has a rating of 50 watts and is designed to operate on any commercial frequency. Transformers of the type described are being made for 110-volt and 220-volt service.



FIGS. 1 AND 2—TRANSFORMERS FOR OPERATING DOORBELLS, DOOR OPENERS, ETC., AND GONGS

The instrument shown in Fig. 3 is adapted for use with tungsten-lamp sign-lighting systems. The active element is housed in a cast-iron case, which is treated with two coats of baked enamel. Both primary and secondary terminal wires are inclosed in porcelain bushings of the weather-proof type. The instruments are

FIG. 3—SIGN-LAMP TRANSFORMER

being made for all standard voltages and frequencies with ratings ranging from 100 watts to 2500 watts. The prime function of the transformer is to reduce the pressure from 100 volts or 220 volts to 11 volts, which permits the use of the 11-volt high-efficiency tungsten lamp in the sign.

## Electrical Equipment for Enabling the Deaf to Hear

The Globe Ear-Phone Company of Boston, Mass., has recently placed on the market several new designs of telephone receivers and transmitters for deaf persons, the apparatus marking a distinct step toward increased

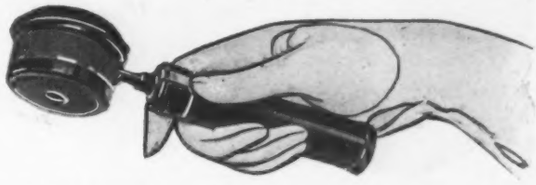


FIG. 1—"LORGNETTE PHONE" FOR USE OF DEAF PERSONS

flexibility of use, service of a less conspicuous character in certain applications, and instrumental power adapted more closely to varying requirements than has hitherto been available. In order to meet the needs of different kinds of deafness, it has been necessary to provide instruments of different pitch or tone, as well

as those having different degrees of sound intensity.

With the present assortment of transmitters and receivers forty-eight different combinations of tone and pitch are available.

The "lorgnette-phone" (Fig. 1) is the latest instrument of this manufacture. In the handle is an ordinary flashlamp battery. The device is light in weight, can be used at either ear, and when not needed can be dropped into the pocket or bag.

FIG. 2—DESK EAR-PHONE FOR THE DEAF

Another new design is the "desk ear-phone" (Fig. 2). This has been developed to meet the needs of persons who want a powerful equipment for home or office use, with ample magnifying power. It employs the ordinary commercial dry battery, and with ordinary use two cells will last from four to six months without renewing. The energy supply is shut off when the receiver is hung up.

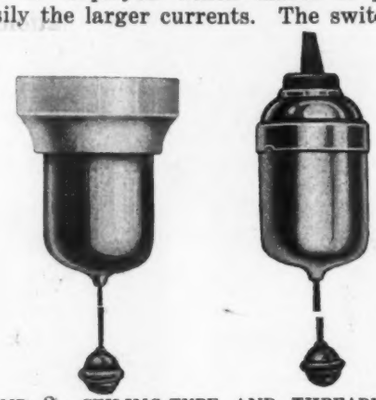
## Batteries for Christmas-Tree Lighting

The General Lead Batteries Company, Newark, N. J., has just brought out a line of Type CT batteries for lighting Christmas trees and operating electric toys, small motors, fans and other devices. The batteries are rated at 4 volts and 6 volts, and the following types with the ratings given are being made: CT-4-85, 0.5 amp. for 85 hours; CT-4-130, 0.5 amp. for 130 hours; CT-6-85, 0.5 amp. for 85 hours; CT-6-130, 0.5 amp. for 130 hours. The sizes of the different types are: 5-in. by 7.375 in. by 9 in.; 6.625 in. by 7.375 in. by 9 in.; 6.75 in. by 7.375 in. by 9 in.; 9.375 in. by 7.375 in. by 9 in.

CHRISTMAS-TREE-LIGHTING BATTERY

## Six-Ampere Pull Switch

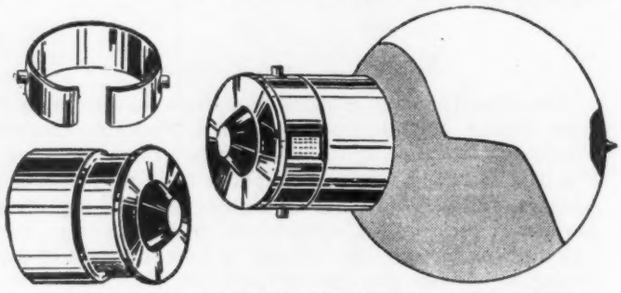
To meet the demand for switches which may be employed to control entire circuits as well as groups of high-candle-power gas-filled lamps, the Cutler-Hammer Manufacturing Company, Milwaukee, Wis., has developed a line of 6-amp. pull switches to take the place of the 3-amp. devices. An improved quick-action switch mechanism is employed which makes it possible to handle easily the larger currents. The switch is made in the ceiling, pendent and threaded-cap types, the shells being interchangeable with brass-shell sockets made by the above-named manufacturer. The pendent type switch has a cord strain relief, making it unnecessary to knot the cord.



FIGS. 1 AND 2—CEILING-TYPE AND THREADED-CAP-TYPE PULL SWITCHES

## Swivel-Bulb Automobile Lamp Reducing Glare

An automobile lamp has lately been developed which may be rotated in its socket and which is provided with a bulb whose surface is partly covered with a semi-translucent compound in such a way that when the clear portion of the lamp bulb is at the top the light rays from the filament strike the upper portion of the reflector and are deflected in an intensified form upon the roadway where they are needed, while those rays which would ordinarily be deflected upward from the bottom part of the reflector and cause glare are subdued or absorbed. The base of the lamp is in size and dimensions exactly the same as the standard base and will fit into any standard Ediswan socket. The pins which hold the lamp in the socket, however, are mounted upon a separate ring which fits into a recessed portion of the lamp base. When the lamp is locked in the socket it may be rotated to bring the treated portion of the bulb at the bottom part of the reflector without changing the position of the socket. The lamp is being made in various ratings for a number of different voltages in both the single-contact and the double-contact type. A. Hall Berry, 97 Warren Street, New York, is sole sales agent for the lamp.



SWIVEL-BULB NO-GLARE AUTOMOBILE LAMP, WITH SEPARATE RING

# News of the Industry

*A Review of Activities in the Electrical Manufacturing, Selling and Central-Station Fields*

## International Trade Conference of National Association of Manufacturers

Commemorating twenty years of practical service to manufacturers, the International Trade Conference arranged by the foreign-trade department of the National Association of Manufacturers, to be held at the Hotel Astor, New York, Dec. 6, 7 and 8, promises to be a timely meeting of prominent men of affairs representing many countries and experts in all branches of international commerce.

The foreign-trade department of the National Association of Manufacturers utilizes in foreign lands a corps of carefully selected men, in number more than double the consuls and agents of the United States government and stationed in every place of commercial importance in the world.

Among the papers to be presented and addresses to be made at the conference are the following: "Commercial Treaties and Their Relation to Foreign Trade," by John Bassett Moore, formerly counselor of the Department of State; "Transportation and Foreign Trade," by Prof. Emory R. Johnson of the University of Pennsylvania, the United States government's special commissioner on Panama Canal traffic and tolls; "Credit Banking and Exchange," by J. J. Arnold, manager foreign exchange department, First National Bank, Chicago, Benjamin Joy, vice-president National Shawmut Bank, Boston, David H. G. Penny, vice-president Irving National Bank, New York, and V. Gonzales, banking adviser of the National Association of Manufacturers, delegate to the Pan-American Financial Conference, and member of the International High Commission; "General Review of the World's Commerce," by Dr. Albert A. Snowden, member of the National Association of Manufacturers' trade commission to Australia and the Far East in 1914; "The Present Export Situation," by Dr. E. E. Pratt, chief of the Bureau of Foreign and Domestic Commerce; "International Trade as a Sign of National Prosperity," by John M. Clausen, Crocker National Bank, San Francisco; "Trade Relations Between Australia and the United States," by P. E. Quinn, former member of the Parliament of New South Wales; "Advertising in Foreign Trade," by H. M. Kahler, editor of *How to Export*, and "Elemental Conditions in Credit Information," by J. H. Tregoe, secretary National Association of Credit Men.

Among the speakers at the banquet on Dec. 7 will be the Ambassador from Brazil and the Minister from Peru.

On the evening of Dec. 6 it is proposed to hold a round-table discussion, at which provision will be made for brief talks on the subjects of credit information and salesmanship, participated in by experienced export salesmen and others.

Educational exhibits are being prepared, including sample packages illustrating approved methods of packing various classes of goods, and others of practical interest to exporting manufacturers.

Delegates from a number of foreign chambers of commerce and banks are expected to take part in discussions. Experts on foreign exchange, credit information, foreign tariffs, forwarding, insurance and trademarks will be in attendance for answering specific questions or for consultation with groups of delegates.

Many foreign business men and representatives of foreign commercial organizations will be present, and provision will be made for consultation with them on the part of those interested in their several countries.

## Electrical Exports for September

The value of electrical goods of American manufacture shipped out of the United States during September, 1915, was $700,000 greater than during September, 1914, according to the Bureau of Foreign and Domestic Commerce. The electrical exports for the first nine months of the year showed a gain of more than $2,000,000.

The principal increases made during the month of September, as will be seen in the accompanying table, were in batteries, insulated wire and cables, metal-filament incandescent lamps, motors and telegraph instruments. At the same time there was a falling off in the exports of generators and telephone apparatus, particularly the latter.

The trade in motors was practically the same for the first nine months of this year as it was for the first nine months of last year, while generator exports decreased by about 20 per cent. Exports of insulated wire and cable were doubled in this period. Foreign purchases of metal-filament incandescent lamps were more than three and one-half times as great during 1915, from January to September inclusive, as during the corresponding months of 1914. The demand for telegraph instruments was practically constant, while there was a considerable decrease in the exports of telephones and transformers.

ELECTRICAL EXPORTS FOR SEPTEMBER, 1915 AND 1914, AND FOR NINE-MONTH PERIOD

| | September | | Nine Months Ended September | |
|---|---|---|---|---|
| | 1915 | 1914 | 1915 | 1914 |
| Batteries | $123,377 | $38,425 | $987,378 | $463,378 |
| Generators | 109,990 | 119,756 | 1,559,513 | 1,866,421 |
| Fans | 33,193 | 18,029 | 263,914 | 271,673 |
| Insulated wire and cables | 318,478 | 91,375 | 2,082,778 | 1,005,747 |
| Interior-wiring supplies, etc., including fixtures | 57,871 | 34,156 | 663,037 | 435,560 |
| Arc lamps | 397 | 1,465 | 17,242 | 31,334 |
| Incandescent lamps: | | | | |
| Carbon filament | 7,041 | 9,960 | 104,464 | 74,030 |
| Metal filament | 118,464 | 30,988 | 539,056 | 149,617 |
| Meters and other measuring instruments | 51,044 | 14,375 | 447,281 | 69,707 |
| Motors | 417,375 | 315,115 | 2,461,761 | 2,462,250 |
| Telegraph instruments (including wireless apparatus) | 5,681 | 3,791 | 80,364 | 78,641 |
| Telephones | 37,180 | 158,922 | 720,039 | 929,840 |
| Transformers | 76,433 | 26,871 | 451,724 | 715,605 |
| All other | 906,767 | 685,240 | 6,862,180 | 6,649,234 |
| Total electrical machinery, etc. | $2,263,291 | $1,548,468 | $17,240,731 | $15,203,037 |

### Economical Construction of Rural Lines

At a joint meeting of the Portland (Ore.) Section of the National Electric Light Association and of the American Institute of Electrical Engineers held on Nov. 9 A. S. Hall, manager of the Hood River Gas & Electric Company, presented a paper on "Economical Construction of Rural Lines." The Hood River Gas & Electric Company has been a pioneer in the Pacific Northwest in the distribution of electricity in rural territory, and about a third of its earnings are from rural business. Mr. Hall went into considerable detail as to the amount his company earned in the rural territory, the amount of operating expenses, and the amount of plant devoted to the work. The Hood River Gas & Electric Company has been appraised by the Public Service Commission of Oregon, and standard rates have been set so that it is possible to make an accurate analysis of the cost of service.

Mr. Hall then pointed out some of the difficulties interfering with extending service to rural communities —difficulties that are not insurmountable. He recommended cheaper line construction, a cheaper type of transformer, and higher voltage. Mr. Hall stated that in his opinion the time would come when power and rural telephone lines would all be placed upon the same poles. This merely would comply with the economic law of necessity, and such a procedure, together with other eliminations of useless investment, would result in the material extension of rural service.

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### Co-operation Between Central Station and Jobbers on the Pacific Coast

The Pacific Gas & Electric Company, San Francisco, Cal., has completed arrangements with seven San Francisco jobbers for a co-operative campaign lasting fourteen months, with the object of increasing the sale of lamp-socket appliances. The campaign will extend over the entire territory served by the company, and for that purpose the territory will be divided into seven districts. Each jobber will work one of the districts for a period of sixty days and then move to another district; thus in fourteen months each jobber will have covered each district once. The order of assigning districts will be decided by lot by the jobbers themselves.

Each jobber agrees to furnish a campaign manager, a demonstrator if necessary, and whatever number of salesmen the Pacific Gas & Electric Company requisitions. The salesmen will be paid by the Pacific Gas & Electric Company $12 a week plus a commission of 50 cents for each socket appliance sold. The jobbers will furnish descriptive literature, advertising copy, stereopticon slides, and a set of data cards on which the company will supply consumers' names. These cards will be returned to the company after the campaign.

An arrangement has been made whereby responsible customers may purchase appliances on the installment plan by paying 20 per cent of the purchase price in cash and the balance in monthly installments, not to exceed six installments when the amount of the sale is less than $25. When the amount of the sale exceeds $25, 10 per cent of the purchase price will be required in cash and the rest in ten equal monthly payment. The prices for those purchasing on the installment plan will be 10 per cent above the regular price.

On all installment sales the company agrees to pay the dealer the regular cash price and assume the responsibility of making the collections, but reserves to itself the right to pass on the customer's credit and will only assume the contracts where the customer's credit is satisfactory to it. The campaign is only applicable to the customers of the Pacific Gas & Electric Company, and the installment plan of payment is not open to any others.

The following San Francisco companies entered into the agreement: Western Electric Company, Electric Appliance Company, Electric Railway & Manufacturers' Supply Company, Telephone & Electric Equipment Company, Pacific States Electric Company, Holabird-Reynolds Company, and Dunham Carrigan & Hayden Company.

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### Ohio Independent Telephone Association Discusses Prosperity and Government Ownership

The twentieth annual convention of the Ohio Independent Telephone Association took place at the Hartman Hotel, Columbus, on Nov. 18 and 19, with representatives of 200 companies present. Addresses were delivered the first day by Frank L. Beam, president of the association; Samuel G. McMeen, president of the Ohio State Telephone Company, and C. Y. McVey, president of the National Independent Telephone Association.

Mr. McMeen said that, despite the European war, the independent companies had gone right ahead with their plans and had succeeded in enlarging their properties and extending their service at every point in the State. He urged continued co-operation among the companies through the exchange of legal and technical information and pledged the aid of the Ohio State Telephone Company to the smaller companies.

One of the features of the second day was the address of H. P. Folsom, who spoke on "Government Ownership of Telephone and Telegraph Systems." The "blue-sky" law in Ohio would prevent the United States government from securing a license to do business in that State, he said, because of the way in which the department accounts are kept and the disbursements and receipts noted. After various investigations, the Postal Department cannot give a clear-cut statement of profit and loss, he said, upon which to base official action. Government ownership is clearly out of the question at this time, he declared. Only three out of forty-eight governors of States had consented to indorse the government ownership of the telephones and telegraphs, while five had favored government regulation. The other forty refused to give the plan their indorsement.

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### One Week More for Panama-Pacific International Exposition

The Panama-Pacific International Exposition is now in its closing month. The gates will close at midnight on Dec. 4. In its architecture, its exhibits, its congresses, its embodiment of world progress in the peaceful arts, it is believed the verdict of the world will be that the Panama-Pacific International Exposition marks the greatest epoch for world betterment.

A program is now being arranged for the closing day. The most striking part of the day's ceremonies will be an international toast, typifying the world peace, world service and world patriotism for which the Exposition has stood sponsor during the past year of war and turmoil. This international sentiment is now being prepared by President Woodrow Wilson.

The toast will be proposed on the Exposition Grounds at noon on Dec. 4. All nations, organizations and institutions participating in the Exposition will be asked to join in the sentiment at noon, Dec. 4, San Francisco time, so that all peoples and practically all nations may join with the Exposition in a toast for a higher type of internationalism.

**Available Water-Power of the United States.**—The available water-power of the United States, excluding Alaska, amounts to more than 28,000,000 hp., of which approximately 7,000,000 hp., or 25 per cent, has been developed.

**Swedish State Railways Use Hydroelectric Energy for First Time.**—The recently completed electric railway from Kiruna to Ricksgransen in the far north of Sweden is the first line on which the Swedish State Railways have employed hydroelectric energy for traction purposes. A large section of this road lies within the Arctic Circle.

**War Increases Sales of Electric Vehicles for Municipal Use in England.**—Owing to the fact that the English war office has commandeered large numbers of horses that were in municipal service and also in many cases gasoline cars, the English municipalities are turning their attention to the electric truck for various purposes. A number of towns now make garbage and refuse collections with large electric trucks.

**Timing Device Regulates Work of Firemen.**—In the power plant of the Trion (Ga.) Cotton Mills a simple timing device consisting of a ratchet wheel operated from a rocker arm on the engine has been installed to regulate the work of the firemen. The ratchet wheel is connected electrically with a bell in the boiler room and arranged to ring the bell at given intervals. Several wheels are used, each wheel corresponding to a given interval between firing times. These ring every five minutes, seven minutes or ten minutes, according to the load and the demand for steam.

**Encouraging Bank Accounts for Employees.**—When H. H. Harrison, president of the Merchants' Heat & Light Company at Indianapolis, Ind., gave the company's employees the opportunity of receiving their wages through checks deposited for them in a local bank ninety-six employees accepted the offer. During the first four months seventy-one of the ninety-six saved money, and the total amount held in the bank to the credit of these employees is $1,856, or an average of more than $26 per man.

**Antenna Resistance.**—Results of experiments on antenna resistance published by the United States Naval Radio Laboratory show a drop in resistance for short wave-lengths and a rise for greater wave-lengths where ground conditions are poor. Experiments indicate also that ground resistance decreases with increasing wave-length. If the ground be considered as a dielectric rather than as a conductor, and that portion of the total dielectric lying between the antennas as the upper plate of a condenser, the ground water being regarded as the lower plate, a probable explanation of the peculiar form of many antenna resistance curves results, according to L. M. Austin of the Bureau of Standards, because it is known that the equivalent resistance of an imperfect dielectric increases as the wave-length is increased.

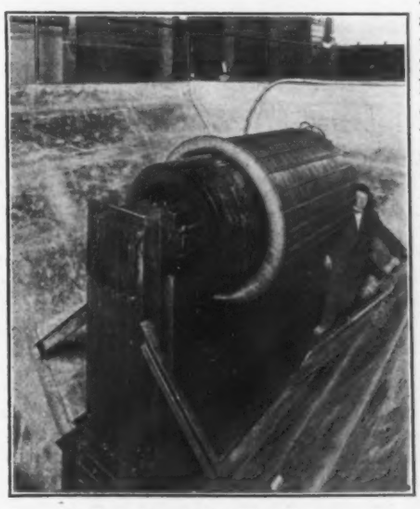
## NOTES
ON ELECTRICAL TOPICS

**Tungsten in the War Market.**—Now that the manufacturers of war materials are beginning to understand the virtues of tungsten, its value has, like zinc, gone soaring from $300 a ton in normal times to $3,000 a ton.

**Illumination Tests with a Camera.**—The Fort Madison (Iowa) Electric Company has been conducting a series of tests to show the comparative efficiency of various forms of lighting units by taking photographs at night in the stores at Fort Madison. In order to contrast the illumination secured, each plate received the same exposure.

**Station Signals by Electric Horns.**—In a Pennsylvania power station an operator is making effective use of an electric horn to notify firemen when an additional unit is to be started. The horn is connected to a bell-ringing transformer with a secondary wound for 6 volts. The horn produces an unmistakable signal and has helped to relieve complication in bell calls.

**A 1000-Kw., 1,000,000-Volt Transformer.**—C. H. Thordarson of Chicago has completed the erection, at the Exposition Grounds, San Francisco, of a 1000-kw., 1,000,000-volt transformer for sixty-cycle operation. The windings are submerged in a 225-bbl. concrete tank of oil, and the transformer complete weighs 30,000 lb. The low-tension 2200-volt coils, of which there are 122, are connected in pairs across the 2200-volt supply mains, with their midpoints grounded to the transformer frame. The 1,000,000-volt winding consists of 190 coils wound with flat aluminum conductors insulated with paper. Some 90 miles of aluminum conductor and 270 miles of paper ribbon were used in the construction of the high-tension winding. Mr. Thordarson estimates the cost of the transformer at $30,000, including special winding machinery.



THE 1000-KW., 1,000,000-VOLT TRANSFORMER JUST COMPLETED AT THE SAN FRANCISCO EXPOSITION

**Water-Power Development.**—At the request of the Chamber of Commerce of Spokane, Wash., a number of similar organizations in different parts of the country have joined in requesting the Chamber of Commerce of the United States to appoint a committee to study the water-power problem throughout the country. The national chamber is also requested to submit a referendum on the subject to its members, outlining action to be taken by Congress in order that water-power now idle may be developed.

**Outdoor Substation in a Village Street.**—On the main street of Pleasant Lake, Ind., a modern outdoor type of substation has been installed connected to the 13,000-volt, three-phase, sixty-cycle line of the Indiana Utilities Company of Angola. At present the transmission voltage is reduced to 2200 volts by a 30-kw. installation of single-phase transformers, but the station will later be equipped with transformers capable of handling a 200-kw. load. The installation permits the town of 500 inhabitants to secure electric service.

**Troubles Which Operators Have to Face.**—As an indication of how speedily serious operating troubles are handled by capable engineers familiar with the plants they operate, Herbert K. Steetchbury of Plattsburg, N. Y., calls attention to a series of troubles which occurred in the space of three hours and were cleared so that operation was restored temporarily in four hours. On one Sunday evening, when trouble was reported at the power house, the following conditions were found: A three-phase, 2300-volt, forty-cycle line transformer was burned out; the switch and cut-out of a 110-volt line from the exciter to a garage was burned out and the porcelain cut-out melted and destroyed; a cut-out from the same line to a high-tension transformer house used to operate trip coils on high-tension switches was destroyed; a trip coil of a high-tension switch in the power house attached to the exciter bus was destroyed; a fuse block on a 2300-volt power line, the same line as mentioned in item No. 1, was grounded to the angle iron of the switchboard frame; two or three lightning arresters on a 2300-volt power line were grounded and had set a pole near by on fire; one leg of the 2300-volt power line was crossed with a telephone messenger, which was also grounded by a guy wire (this was the fourth ground on a circuit only a mile long); two lighting circuits got badly tangled up in a tree and burned off; a tree came down across another alternating-current lighting circuit and arc circuit and trolley, breaking these circuits, and sparks from the burning pole mentioned above were carried by the wind under a forebay cribwork, setting it on fire. Mr. Steetchbury regards this as one of the exciting times of his thirty years of operating experience and thinks it was the culmination of as much trouble as ever comes to an operator at one time. It was certainly enough to create resourcefulness, which is a qualification essential to a station engineer's success.

# Associations and Societies

**Minnesota Independent Telephone Association.**—The annual meeting of the Minnesota Independent Telephone Association will be held in Minneapolis on Jan. 25 and 26.

**Lynn Section, A. I. E. E., Hears Talk on War Surgery.**—At the meeting of the Lynn (Mass.) Section of the American Institute of Electrical Engineers on Nov. 3 Dr. Edward Hall, who spent several months with the armies in France, spoke on "War Surgery in France."

**New Publication for Technical Men.**—The first number of a new monthly bulletin, *The Technician*, published by the Associated Technical Men (Inc.), 1215 Monadnock Building, Chicago, Ill., was issued in November. A. M. Wolf is editor and A. E. Gibson is business manager.

**New Officers of the Minneapolis Jovian League.**—O. A. Rofelty, assistant treasurer of the Minneapolis (Minn.) General Electric Company, was elected tribune of the Minneapolis Jovians at the annual meeting on Nov. 4. H. E. Billhart, also of the Minneapolis company, was re-elected secretary.

**Portland Section, N. E. L. A.**—The next meeting of the Portland (Ore.) Section of the National Electric Light Association will be held on Dec. 7, when there will be a series of pictures shown by the Pacific Telephone & Telegraph Company depicting the transcontinental line. A paper on "Taxation of Corporations" will be presented by Blaine Hallock, representing the Union Pacific System. The meetings of the Portland Section are held once a month.

**Ithaca Section, A. I. E. E., Boosting Prosperity Week.**—The Ithaca (N. Y.) Section of the A. I. E. E. is co-operating with the Cornell student branch in planning for a special Prosperity Week meeting. Demonstrations of domestic electrical apparatus of all sorts will be given, together with talks on their construction and operating characteristice. Several pieces of apparatus will be loaned by local dealers, and out-of-town companies will be asked to aid in the work.

**Educational Course for Pittsfield Section, A. I. E. E.**—The first of a series of educational lectures in the special course of the Pittsfield (Mass.) Section of the American Institute of Electrical Engineers was given on Nov. 4 at The Wendell. The lecture was given by S. W. Ashe of the welfare and educational department of the Pittsfield Works of the General Electric Company, the subject being "Central-Station Equipment and Operation." The second lecture in the course was given on Nov. 11 by A. H. Kreusi, construction engineer of the Schenectady office, on the subject of "Fuels and Their Utilization."

**Census of Gas-Producer Plants in New York City.**—At the meeting of the American Society of Mechanical Engineers held in New York City on Nov. 9 Charles M. Ripley reported an investigation of the size, age and performance of gas-producer power plants in and around New York City. The data presented for thirty-three plants showed low operating cost and satisfactory service, especially in installations of small size below 250 kw. Only plants which are self-contained power-producing units, taking coal and converting it into electrical energy, were discussed. Representatives of several gas-producer manufacturers took part in the discussion and showed lantern slides of plants in operation.

**New York Section, E. V. A., Elects Officers.**—At the monthly meeting of the New York Section of the Electric Vehicle Association of America, Nov. 10, D. C. Fenner was elected chairman, S. G. Thompson vice-chairman, D. F. Tobias secretary, and the following were appointed members of the executive committee: C. E. Poyer, T. C. Martin, S. S. Sampson, C. A. Ward, E. P. Chalfant, Nathaniel Platt, F. C. Smith, Harvey Robinson and W. P. Kennedy. After the election of officers Charles A. Ward, secretary-treasurer of the Ward Motor Vehicle Company, read a paper entitled "The Field for the Small Electric Delivery Vehicle." This paper was presented at the Cleveland convention in Mr. Ward's absence. The paper was discussed by R. M. Lloyd, F. W. Smith, S. G. Thompson, Harvey Robinson, D. F. Tobias, D. C. Fenner, F. N. Carle and H. H. Martin. Questions of mileage radius and the ability of the light-weight electric truck to compete with the light-weight gasoline truck and horse-drawn vehicles were brought up in the discussion.

**Pittsburgh Section, A. I. E. E.**—The November meeting of the Pittsburgh Section of the American Institute of Electrical Engineers was held Nov. 10 at the Seventh Avenue Hotel, Pittsburgh. Preceding the meeting, dinner was served to the members and friends. H. L. Badger, plant superintendent of the Central District Telephone Company, talked on the "Development of the Telephone Central Station." The lecture was illustrated with lantern slides.

**Technical Committee of the Northwest Association.**—E. G. Robinson of Arlington, Wash., president of the Northwest Electric Light & Power Association, has appointed the following members of the hydro-electrical and technical committee of the association: Chairman, J. C. Martin, Portland, Ore.; H. R. Wakeman, Portland; G. E. Quinan, Seattle, Wash.; J. B. Fisken, Spokane; L. T. Merwin, Portland, and F. B. Nimms, Port Angeles, Wash. W. G. Letson of Arlington, Wash., was appointed secretary of the Northwest association at the last executive meeting, held at Seattle in October.

**Joint Meeting of Portland Section of the A. I. E. E. and N. E. L. A.**—The annual "get-together" meeting of the Portland (Ore.) sections of the American Institute of Electrical Engineers and the National Electric Light Association was held in Portland, for the second time, at the Portland Automobile Club on Oct. 13. One hundred and forty-three members of both societies attended. The work of the coming year was touched on by J. E. Davidson, Paul Ledenbaum, O. B. Coldwell and L. A. McArthur. Rufus Holman, chairman of the County Board, spoke on "Efficiency in County Government" and expressed the hope that eventually all the paved county highways will be lined with ornamental shade trees and cluster lights.

**Electrical Credit Association of Philadelphia Anniversary.**—The twentieth anniversary of the founding of the Electrical Credit Association of Philadelphia was observed on the evening of Nov. 4 with a banquet in the Adelphia Hotel. The speakers were the Rev. Floyd W. Tomkins, James T. Cortelyou, chief post office inspector; Frederick B. Vose, national secretary of the association and secretary of the Chicago branch, and Francis Nelson, secretary of the New York branch. Officers were elected as follows: President, C. A. Terbush; vice-president, William T. Pringle; secretary and treasurer, J. W. Crum; executive committee, L. R. Browne, George B. Miller, C. E. Ludovici, H. N. Stayton, Thomas H. West and William T. Pringle.

**Boston Section, A. I. E. E.**—W. H. Pratt of the General Electric Company, Lynn, Mass., gave an illustrated talk on "Electric Meters" at the Engineers' Club, Boston, Mass., before the Boston Section of the American Institute of Electrical Engineers on Nov. 9. William Bradshaw of the Westinghouse Electric & Manufacturing Company exhibited a new prepayment device fitting a standard meter of Westinghouse make, the noteworthy feature being a double clock-hand indication of the amount of energy available at any time between the coin deposit and the exhaustion of its purchasing power. F. P. Cox of Lynn, Mass., explained the use of diamond bearings in meters with heavy moving elements and the use of sapphires in lighter instruments.

**Ohio Society of Mechanical, Electrical and Steam Engineers.**—The annual meeting of the Ohio Society of Mechanical, Electrical and Steam Engineers was held at Zanesville, Ohio, Nov. 18 and 19. Among the papers scheduled for presentation were the following: "Some Elements of Smokeless Furnace Design," by Osborn Monnett, Chicago (formerly smoke inspector of Chicago), mechanical engineer American Radiator Company; "'Soot'—Its Composition, Its Effect on Boiler Efficiency and Its Removal by Mechanical Cleaners," by F. A. Moreland, Chicago, secretary G. L. Simonds & Company; "Monel Metal," by Charles W. Biddle, Jr., vice-president Supplee-Biddle Hardware Company, Philadelphia, Pa.; "Advertising and Its Influence on Engineering," by A. R. Maujer, Chicago, Western advertising manager *Power;* "The Rolling-Ball Trap," by Charles S. Brown, Nashville, Tenn., professor of mechanical engineering, Vanderbilt University, and A. A. Cryer, New York, D. G. C. Trap & Valve Company, and "The Development of the Vacuum System of Steam Heating and Appliances," by Robert L. Claypool, Camden, N. J., Warren Webster & Company.

# Public Service Commission News

### Michigan Commission

Rates charged by a utility based on the amount of investment previous to its merger with other companies have no bearing upon or relation to the rates proposed to be charged in the future. These must be based upon the necessary investment now and in the future in use for the purpose of furnishing the quality and quantity of service demanded by the subscribers, according to the decision of the Michigan Railroad Commission in the rate case of the Southern Michigan Telephone Company.

### New York Commissions

Special permission has been granted to the New York Edison Company and to the United Electric Light & Power Company by the Public Service Commission, First District, New York, by which each company may place in effect on five days' notice a new tariff for the sale of electric meters. This tariff gives the prices at which the meter now installed upon the premises of the customer may be purchased by the customer, with the understanding that if subsequently such metering is no longer required the meter so purchased may be returned within a period of six months from Jan. 1, 1916, and if in acceptable condition, the full amount paid for it will be refunded. The prices quoted for the meters range from $8 to $25, according to the rating of the meter.

A series of orders by the Public Service Commission, Second District, New York, have been made to regulate the distribution of electricity by several companies in the Oswego River Valley. The People's Gas & Electric Company has a franchise from the Town Board of the town of Scriba, Oswego County, for the retail distribution of electricity. The exercise of this franchise and the construction of a distribution plant is approved by the commission. Extensions of the limits of the Niagara, Lockport & Ontario Power Company in this same territory are restricted to the distribution of electricity at high voltage only to its customers. The Niagara, Lockport & Ontario company is authorized to build a line from the hydroelectric plant at Minetto, across the Oswego River and Canal, and to a junction with the line of the Oswego River Power Transmission Company in the town of Volney, to build a distribution system for high-voltage electricity only in the town of Scriba, to purchase and use for the same purpose the existing transmission line of the Oswego River company from Seneca Hill in the town of Volney through the town of Scriba to the Oswego city line, and to lease the Oswego River company's line from the Oswego River to Seneca Hill. Objection was made by the People's Gas & Electric Company to permitting these last-mentioned lines to be used for low-voltage transmission, and the Town Board of Scriba passed resolutions declaring that the franchise of the Niagara company in the town was only for high-voltage electricity. The commission has accordingly limited the operation of the Niagara, Lockport & Ontario lines to electricity for its high-voltage customers only, preserving the low-voltage field for the People's company.

### Indiana Commission

An order has been entered by the Public Service Commission of Indiana approving a contract for city lighting entered into by the Laporte Gas & Electric Company and the board of public works of the city of Laporte and expressly stipulating its approval of all of the contract except the rates, tolls and charges set out therein, these being allowed to stand "until further order of the commission." The commission points out in thus doing that the utility law puts the rates, tolls and charges for such service continuously in the hands of the commission.

### California Commission

The Marion Water & Power Company disputed the jurisdiction of the California Railroad Commission over the rate for water to the Sausalito municipal distributing system, which had previously been fixed by contract, contending that in entering into this contract it was acting entirely in a private capacity and not as a public utility; also that the State has authorized the town to contract away the State's power to regulate the rate, and that by the town entering into such contract it nullified whatever jurisdiction the State had over such rate during the life of the contract.

The commission, however, held that to contend that the sale of water to the municipality is of a private nature is clearly erroneous, for if such were the case, utilities could refuse to serve any one except under contract, thereby entirely removing themselves from public regulation of any nature whatever. That as regards this service and other services the company is a public utility subject to the jurisdiction of the commission.

The commission further ruled that it is now unanimously held that the provisions of the United States Constitution forbidding laws impairing the obligations of contract have no application to the regulation of utilities by States under their police power. All contracts, whether entered into prior or subsequent to the exercise by a State of its power to supervise rates, are subject to such control. The company's contention that this contract differs from other contracts of a like nature because one of the parties thereto is a municipality and not a private individual or company was held to be in error, for there is relatively no difference whatever between a municipal corporation acting in the capacity of a private corporation as a consumer and a private corporation as a consumer.

In considering the application of the Sweetwater Water Company for authority to increase its rates, the commission held that, irrespective of the fact that a plant is constructed primarily for the purpose of increasing realty values, the real estate being afterward sold at a profit, the company building the system is still entitled to a return on its reasonably useful value, and that profits made on realty cannot be considered as detracting from the value of the plant. However, such value shall not include unnecessary or long extensions which would not have been constructed except for the purpose of enhancing property values.

### Idaho Commission

The Public Utilities Commission of Idaho has handed down an order and opinion in the case of James H. Taylor, as Mayor of the city of Wallace, versus the Northwest Light & Water Company and the Sunset Brewing Company. The complaint of Mayor Taylor, who acted on behalf of the City Council of Wallace and its citizens, was that the rates charged by the Northwest Light & Water Company for electricity were unjust and unreasonable. The order was written by Commissioner John W. Graham and concurred in by the associate commissioners, Axel P. Ramstedt and A. L. Freehafer.

"When the valuation of a public utility has been determined on a scientific plan for rate-making purposes, and a schedule of rates fixed in accordance with such valuation, then that valuation and the valuation for taxation purposes should be practically the same, of course," says the commission in its opinion. "There is no justice or equity, in the practice of assessing boards for taxation purposes, in fixing excessive valuations on public utilities where the valuation for rate-making purposes has been determined. In case an excessive valuation for taxation purposes is made, the burden will eventually fall directly upon the customers of that utility."

Outlining the policy of the commission regarding rates of return, the decision reads:

"The defendant claims that it should be entitled to from 10 to 12 per cent annual return on the value of the property. . . . Considering the hazard and risk connected with operating a utility of this character in a community like this, . . . the commission finds that 10 per cent per annum is a reasonable rate of return to be allowed in this case. It must be distinctly understood that the rate of return allowed in this case shall not be considered as the fixed rate of return for all utilities of this character. The rate of return in each case shall be determined after due consideration of the hazard and risk connected with the operation of the utility, the efficiency in operation and the economy in management, giving to that utility showing the highest efficiency in operation and the greatest economy in management and furnishing service to the consumer at the lowest possible cost the highest rate of return. This policy will encourage the management of all utilities to keep their plants up to the highest point of efficiency, to practice all economy possible in operation, and to reduce the cost of the commodity to the consumers to a minimum."

# Corporate and Financial

**American Railways Company, Philadelphia, Pa.**—All holders of the company's common stock have been offered $50 per share by the National Properties Company, payable in its collateral trust bonds to be dated Jan. 1, 1916, and to run for thirty years. The bonds will bear 4 per cent interest for the first two years, 4.5 per cent for the next two years, and 5 per cent thereafter until maturity or redemption, with a provision for an increase up to 6 per cent, but no more, by making the interest rate equal the rate of dividend up to that percentage paid or declared by the National Properties Company in any year on its common stock. The bonds will be secured by the deposit and pledge of all of the common stock of the American Railways Company which may be acquired under the offer, together with $2,560,000 additional capital stock of that company, against which no bonds will be issued. The offer is not binding on the National company unless accepted by holders of 75 per cent of the outstanding stock. In the judgment of the board of directors of the American Railways Company, the offer made by the National Properties Company is an advantageous one. Under the offer, if accepted, the holder of the common stock of the company will receive a fixed obligation for the par value of his stock, bearing a rate of interest equal to the dividends now paid upon the stock and increasing progressively as above set forth. For the payment of this obligation the National Properties Company is liable, and as security therefor the stockholders will have their present stock plus $2,560,000 par value additional stock. In case its offer is accepted, the National Properties Company agrees to purchase, for cash, at par, the 5000 shares of preferred stock should stockholders of the railways company not exercise their rights to subscribe. The railway company will be strengthened by the receipt of $500,000 in cash and will be further strengthened by the acquisition by the American Railways Company of Delaware of the stock of the Wilmington & Philadelphia Traction Company, above referred to, which has a present earning capacity sufficient to pay the dividend of 7 per cent upon the $2,000,000 of new preferred stock which is to be issued and to leave a substantial balance applicable to dividends upon the new common stock.

**Pacific Gas & Electric Company, San Francisco, Cal.**—The California Railroad Commission has issued a supplemental order authorizing the company to reimburse its treasury to the amount of $1,447,500 from the sale of bonds and stock, the money being used for plant expenditures, and to issue first preferred stock up to March 1, 1917, instead of being limited to Nov. 1, 1915.

**Republic Railway & Light Company, New York, N. Y.**—An issue of $3,000,000 of three-year notes and an issue of $7,000,000 of five-year 5 per cent bonds of the Mahoning & Shenango Railway & Light Company, a subsidiary, have been sold to bankers. The proceeds of the sale of these securities will be used to pay off the $3,000,000 5 per cent notes of the Republic Railway & Light Company, maturing Jan. 1, 1916, and the $4,844,000 Mahoning & Shenango Railway & Light Company first consolidated refunding mortgage 5 per cent bonds, also maturing Jan. 1, 1916, to pay off all floating indebtedness of the Republic Railway & Light and the Mahoning & Shenango Railway & Light Companies and their subsidiaries, and to furnish funds for construction requirements well into 1916.

**Standard Gas & Electric Company, Chicago, Ill.**—The plan which the company outlined to its stockholders early in September for the financing of further developments of the company through the sale of an issue of $3,750,000 of twenty-year 6 per cent gold notes has been declared effective, inasmuch as subscriptions to the issue are already in excess of $2,000,000. The proceeds of the notes sold will accomplish the retirement of the collateral trust notes due June 1, 1916. The directors of the company at the next meeting will declare for payment on Dec. 15, 1915, to shareholders of record Nov. 30, of a quarterly cash dividend of 1 per cent on the preferred stock of the company. The sale of additional 6 per cent notes will continue, and the company expects that a substantial amount will be sold. If this does not prove to be the case, some plan will be adopted for the accomplishment of the other purposes set forth in the original plans.

**Standard Electric Light Company, Kansas City, Kan.**—This company, formerly a part of the Kansas City (Mo.) Electric Light Company, which before the establishment of the municipal plant in Kansas City, Kan., served that city, is now removing its poles and will surrender all its customers except a few large power users to the municipal central station. A year ago the receivers of the electrical utilities at Kansas City agreed to the withdrawal of the company, franchises having expired in all districts on the Kansas side except in Argentine. In the latter district there was a franchise with five years yet to run. Argentine is now a part of Kansas City, Kan., and at a recent conference the Standard Electric Light Company agreed to surrender rights it had claimed under that franchise. All the company's equipment is to be removed from the streets by May 1, 1916, and all the small consumers and power customers are to be surrendered by Jan. 1. There are five large customers of the Standard which will continue to get energy from it, their equipment being for twenty-five cycles, whereas the municipal service is sixty-cycle. Eventually, however, they also will get city service. The plant of the Standard company on the Kansas side will probably continue to be operated to supply Missouri industrial customers, the plant being near the State line. The municipal plant put into service on Nov. 8 its new 5000-kw. unit and has recently completed a six-mile service circuit of 66,000 volts. Another 5000-kw. unit will probably be bought next year, bids to be asked about Jan. 1. A fund of $3,500,000 is to be raised to underwrite the claims that have priority over those of the bondholders. The stockholders are required to underwrite this sum, as a maximum, in first mortgage refunding bonds, at par, but the stockholders are not assessed. This fund is to be used to defray the expenses of the receivership and the reorganization, retire $854,000 of receivers' certificates, and give the property $1,000,000 of working capital. To make sure that the stockholders are not directly assessed in the raising of this fund, the plan provides that if the bonds do not sell at par the stockholders are to be reimbursed from the earnings before dividends are paid on the participating certificates.

**Texas Utility Company.**—This company, which is yet to be incorporated, has recently taken over lighting utilities in Plainview, Lubbock and Lockney, Tex. The company, it is understood, is backed by St. Louis capitalists headed by H. Wurdack. The concerns taken over have a physical valuation of more than $350,000, and the first incorporation will be limited to $500,000, owing to the complexity of Texas incorporation statutes, although it is planned to increase the capitalization to $1,000,000 within two years if projected amendments to the laws of Texas will permit. In addition to the power, ice and water utilities taken over by the Wurdack interests, about 75 miles of transmission lines have been acquired in Floyd, Hale and Lubbock Counties, and energy will be sold to farmers for pumping for irrigation at a low rate.

**Vermont Power & Manufacturing Company, St. Albans, Vt.**—Rumors are current that the control of the company will shortly pass to Massachusetts financiers who are closely connected with the St. Albans & Swanton Traction Company.

**Western Electric Company, Chicago, Ill.**—Because the statutes of the State of Illinois do not provide for a classification of capital into common and preferred stock, which the stockholders now think it desirable for the company to have, it has been decided to change the legal domicile of the company from Illinois to New York. No change in policies, operation or management is involved in this change of incorporation under New York laws. The change has been agreed to by the unanimous vote of all shareholders in the present Illinois corporation. What the New York company will do will be to issue $15,000,000 of non-voting 6 per cent preferred stock to the present holders of the $15,000,000 stock of the Illinois corporation. In addition, the new company will issue 150,000 shares of new common stock of no par value, but with $5 paid in. In other words, the recapitalization involves the raising of but $750,000 new cash.

**West St. Louis Water & Light Company, St. Louis, Mo.**—A block of $100,000 of first mortgage sinking-fund 5 per cent gold bonds, due Aug. 1, 1928, is being offered at 93.5 and interest.

# Manufacturing and Industrial

**The Nunn Electric Company**, Amarillo, Tex., dealer in electric and telephone supplies, is establishing a large jobbing house in Oklahoma City, Okla., which will be in charge of O. T. Jenkins, who for the past seven years has been associated with the B-R Electric Company of Kansas City.

**The Barber Electrical Manufacturing Company**, North Attleboro, Mass., has recently been formed and will be engaged in the manufacture of switches, switchboards and cut-outs. H. C. Barber is president, W. W. Plattner secretary, and C. E. Riley treasurer. The board of directors consists of Frank Mason, C. E. Riley, O. W. Clifford, A. H. Riley, H. C. Barber, L. E. Freeman and E. T. Upham.

**Reppell Electric Company, Kansas City, Mo.**—John J. Magee, recently manager of the Federal Sign System (Electric) at Kansas City, Mo., who has been with that company about nine years and in charge of several of its principal offices, has bought at court sale the Reppell Electric Company, Kansas City, and is now operating it. The company has had a store and headquarters for contracting work at Thirty-third and Summit Streets for the last seven years.

**Large Sales of Interchangeable-Letter Signs.**—The Flashtric Sign Works, 215 South Clinton Street, Chicago, Ill., announce that last year they sold 28,000 of their interchangeable-letter window signs. These signs are 40 in. long by 7 in. wide and hold thirty letters and spaces. The company is also making an 8-ft. outdoor sign which holds twenty-four two-color 12-in. interchangeable letters, twelve on each side. A considerable number of the latter signs have also been sold.

**The Moody Engineering Company**, 115 Broadway, New York, has been retained as engineer by the Tucuman Tramways, Light & Power Company, Argentina, with head offices in London, England, which has ordered considerable electrical equipment in this country. The company has also been retained by Alfred Dickinson & Company, consulting engineers of London and Birmingham, England, to test a 10,000-kva. generator ordered from the General Electric Company for the Tata Hydroelectric Power Supply Company, Ltd.

**The American Car & Ship Hardware Manufacturing Company**, New Castle, Pa., manufacturer of brass and bronze bushings and bearings, castings, etc., is making large additions to its plant in order to take care of its greatly increased business. When the additions are completed the output of the plant will be almost doubled. P. J. Flaherty, general manager of the company, states that the large increase in business has not been caused by the war. The company, Mr. Flaherty states, has been offered several war contracts, but has refused them.

**The C & C Electric & Manufacturing Company.**—Halbert P. Hill, who has been identified with the early development of the rotary converter and auxiliary apparatus, is now employed by the C & C Electric & Manufacturing Company, Garwood, N. J. Mr. Hill has also been interested in the development of horizontal and vertical ball-bearing motor-generator sets for motion-picture machines and battery-charging outfits. The various types of apparatus designed and patented by Mr. Hill will now be manufactured by the C & C Electric & Manufacturing Company.

**Grand Prize for "Armco" Iron.**—The Jury of Awards of the Panama-Pacific Exposition has awarded a grand prize to the American Rolling Mill Company, Middletown, Ohio, for its "American ingot" or "Armco" iron. A number of "Armco" iron products have been displayed in the Palace of Mines and Metallurgy, under the joint auspices of the Association of Armco Iron Culvert Manufacturers and the American Rolling Mill Company. American ingot iron is 99.84 per cent pure and is especially adapted for electrical purposes. The iron was described quite extensively in the ELECTRICAL WORLD of July 24, page 213.

**Motors for Talking Machines.**—Contractors in Louisville are studying the matter of installing electric motors and other electric equipment in talking machines, as several have been doing in cases of player-pianos. The dealers in the various makes of talking machines have been displaying and selling those that are electrically driven and are taking orders at the same time for converting old models of the spring-driven type to electrically operated machines. The electric models have the automatic stopping devices and are preferred on that account, as well as in view of the fact that they obviate the necessity of constant winding.

**Ampere-Hour-Meter System of Car Lighting Not Affected by Prior Litigation.**—In a decision recently made by the United States District Court for the Western District of New York, in connection with a suit against the United States Light & Heating Corporation, Niagara Falls, N. Y., by the Safety Car Heating & Lighting Company, 2 Rector Street, New York, it is held that car-lighting equipment made by the United States Light & Heat Corporation, in which an ampere-hour meter is utilized to control battery charging, does not come under the injunction or the accounting ordered in a prior decision sustaining the Creveling patent.

**Omaha Jobber Establishes Des Moines Branch.**—The Mid-West Electric Company of Omaha, Neb., has leased a three-story building in Des Moines, Iowa, and has established a branch jobbing house there. Five additional salesmen reporting to G. A. Seabury, general manager of the company, have been placed in the Iowa territory, and Mr. Seabury will hereafter spend part of his time in Des Moines and part in Omaha. Business prospects in the new territory, according to this jobbing house, are at present very bright, the first month's business from the Iowa branch having proved very gratifying. In the Omaha territory the 1915 business of the Mid-West Electric Company far exceeds that of any previous year.

**Sales Convention of Electric Storage Battery Company.**—The eighth convention of the sales managers of the Electric Storage Battery Company of Philadelphia, Pa., was recently held at the Bellevue-Stratford Hotel, Philadelphia. The managers of the New York, Boston, Chicago, Cleveland, San Francisco, Denver, St. Louis, Detroit, Pittsburgh, Atlanta, Washington, Rochester and Pennsylvania sales offices attended the convention. The sessions opened each day at 9:30 a. m. and closed at 5:30 p. m. Herbert Lloyd, president and general manager of the company, presided over the convention, which was of one week's duration. Papers bearing upon the development of various fields of storage-battery service were presented by engineers and department heads of the company, and a number of subjects were discussed concerning important matters pertaining to the different territories. During the evenings the sales managers were entertained by officials of the company.

**Orders for Hydroelectric Apparatus.**—The I. P. Morris Company, Philadelphia, Pa., has recently closed a contract with the Turners Falls (Mass.) Company for a 9700-hp. turbine of the vertical shaft, single-runner type which will operate under a head of 54 ft. at a speed of 97.3 r.p.m. The unit will be similar in design to three existing units furnished the Turners Falls Company by the I. P. Morris Company. The company has also received a contract for rebuilding four 1335-hp. turbines in the Hound Chutes plant of the Northern Ontario Light & Power Company, near Cobalt, Canada. The units were built by another contractor and are of the vertical-shaft, single-runner type operating under a head of 32.5 ft. at a speed of 150 r.p.m. Another contract for one 2500-hp. turbine of the vertical-shaft, single-runner type and a governor for the Sandy Falls plant of the Northern Canada Power Company, Ltd., near Timmins, Ontario, Canada, has been received. The turbine will operate at a speed of 136.5 r.p.m. under a head of 34 ft. and forms the third unit in the plant, the two existing ones having been supplied by other contractors.

**Large Increase in Business Necessitates Building of Three New Structures for Roller-Bearing Company.**—A. P. Sloan, general manager of the Hyatt Roller Bearing Company, Newark, N. J., states that business everywhere is going forward and that the increase in his company's business has been so great that three new buildings will be erected this fall to take care of the large number of orders being received. Work on the buildings is being pushed as rapidly as possible. The three new structures will increase the facilities of the Hyatt plant by 33 per cent. When they are completed the company will have a total of over 600,000 sq. ft. devoted exclusively to the manufacture of roller bearings. Two of the new buildings will be twin structures,

each being 200 ft. long, 50 ft. wide and eight stories high. The third building will be 90 ft. wide, 110 ft. long and six stories high. The twin buildings will be used for press work, assembling of roller-bearing parts and shipping. The other structure is especially designed for the heat-treating processes which are utilized in the manufacture of bearings. This building will be provided with an interesting ventilating system operated by four motor-driven 10-ft. fans in a housing on the roof of the building. A central duct, which increases in size from the first to the top floor, is part of the system, which is designed to change the air on each floor every minute.

### NEW YORK METAL MARKET PRICES

| | Nov. 16 Selling Prices £ s d Bid | Asked | Nov. 22 Selling Prices £ s d Bid | Asked |
|---|---|---|---|---|
| London, standard spot* | 78 5 0 | | 82 15 0 | |
| Prime Lake | 18.62½ | to 18.87½ | 19.75 | to 20.00 |
| Electrolytic | 18.62½ | to 18.87½ | 19.62½ | to 19.87½ |
| Casting | 18.25 | to 18.50 | 19.12½ | to 19.37½ |
| Copper wire base | 19.75 | to 20.00† | 20.87½ | to 21.12½† |
| Lead | 5.25 | | 5.25 | |
| Nickel | 45.00 | to 50.00† | 45.00 | to 50.00† |
| Sheet zinc, f.o.b. smelter | 18.00† | | 20.00† | |
| Tin, Straits | 42.75† | | 39.62½ | |
| Aluminum, 98 to 99 per cent | 58.00 | to 60.00† | 56.00 | to 58.00 |

### OLD METALS

| | | | | |
|---|---|---|---|---|
| Heavy copper and wire | 15.50 | to 15.75† | 16.00 | to 16.25† |
| Brass, heavy | 10.50 | to 10.75† | 10.50 | to 11.00† |
| Brass, light | 9.00 | to 9.25† | 9.00 | to 9.25† |
| Lead, heavy | 4.60 | to 4.65† | 4.50 | to 4.75† |
| Zinc, scrap | 13.00 | to 13.25† | 13.50 | to 14.00† |

### COPPER EXPORTS

Total tons to Nov. 22 ..... 16,570

†Nominal.

## New Incorporations

**The Liberty Electric Company**, Liberty, Ill., has been incorporated with a capital stock of $2,500 by Steven G. Lawless and others.

**The Cush Creek Light & Power Company**, Glen Campbell, Pa., has been granted a charter to operate an electric light and power plant in Glen Campbell.

**The Tyrone Electric Light, Ice & Power Company**, Tyrone, Okla., has been incorporated with a capital stock of $10,000 by H. Gilmore, G. W. Riffe and others.

**The Pierce County Light & Power Company**, Wilkeson, Wash., has been chartered with a capital stock of $100,000 by F. L. Van Nice, Hiram Davis and W. H. Pringle.

**The Public Electric Company**, Boston, Mass., has filed articles of incorporation with a capital stock of $320,000. The directors are: D. V. Carruth, president; Walter R. Dame, Clinton, treasurer, and A. G. Auger.

**The Pennsboro Ice & Power Company**, Pennsboro, W. Va., has been incorporated by H. E. Hopkins, Pennsboro, and J. L. Horner, Clarksburg. The company is capitalized at $25,000 and intends to install an electric-light plant and ice factory.

## New Industrial Companies

**The Texas Gas & Electric Company**, Houston, Tex., has been incorporated with a capital stock of $1,000 by C. L. Carter, W. A. Parish and Raymond Neilson.

**The Floresville Light & Power Company**, Floresville, Tex., has been incorporated with a capital stock of $25,000 by B. J. Carrico, B. H. Martin and W. T. Pittman.

**The Jacksonville Electric Company**, Jacksonville, N. C., has been chartered with a capital stock of $10,000. The incorporators are L. M. Avery, George A. Hurst and others.

**The Port Arthur Gas & Power Company**, Port Arthur, Tex., has been incorporated with a capital stock of $250,000 by J. S. Connelly, S. B. Redmond and Edward S. Ellis.

**The McComb & Magnolia Railway & Light Company**, McComb, Miss., has been incorporated with a capital stock of $500,000 by M. R. Walter, S. M. Jones and others. The company has purchased the plant of the McComb Electric Company.

**The Lebanon Light Company**, Lebanon, Va., has been incorporated with a capital stock of $5,000. The officers are: E. R. Combs, president; T. A. Hendricks, secretary and treasurer, both of Lebanon, and H. M. Johnson, Grundy, general manager.

**The Milton Schnaier Contracting Corporation**, New Rochelle, N. Y., has been incorporated with a capital stock of $25,000 by M. Schnaier, E. C. Harrington and G. Abrams, 347 Columbus Avenue, New York, N. Y. The company intends to do general contracting, plumbing and electrical work.

## Trade Publications

**Meters and Transformers.**—The Duncan Electric Manufacturing Company, Lafayette, Ind., has published an illustrated folder on its meters and transformers.

**Electric Lantern.**—A battery-operated hand lantern is described in an illustrated folder issued by the H. W. Johns-Manville Company, Forty-first Street and Madison Avenue, New York.

**Hydrometer Syringe.**—A hydrometer syringe for noting the condition of storage batteries is described in Bulletin No. 12, issued by the General Lead Batteries Company, Newark, N. J.

**Electric Supplies.**—The Electrician's Co-operative Supply House, Chicago, Ill., is sending out an illustrated folder which contains information on a large number of small electric devices.

**Sewing-Machine Motor and Vacuum Cleaners.**—The Bissell Motor Company, Toledo, Ohio, has prepared booklets on its portable electric vacuum cleaner and small sewing-machine motor.

**Fractional-Horsepower Motors.**—"The Little Tots" is the title of an illustrated folder on fractional-horsepower single-phase motors issued by the Century Electric Company, Nineteenth and Olive Streets, St. Louis, Mo.

**Window Poster on Electric-Heating Devices.**—The American Electrical Heater Company, Detroit, Mich., is sending out a window poster printed in several colors and illustrating several types of its electrically operated heating devices.

**Portable Electric Grinder.**—Bulletin G-9, which supersedes Bulletin G-8, issued by the Standard Electric Tool Company, Cincinnati, Ohio, is illustrated and contains information on several types of portable electrically operated grinders.

**Flashers.**—Bulletin No. 33, just issued by the Reynolds Electric Company, 422 South Talman Avenue, Chicago, Ill., contains information on flashers for electric signs and displays, color hoods, and small alternating-current and direct-current motors.

**Controlling Devices.**—Handbook No. 4 on controlling devices has just been issued by the Industrial Controller Company, 850 Greenbush Street, Milwaukee, Wis. The book contains 184 pages and a large number of diagrams and halftone illustrations.

**Switch, Cut-out and Meter-Testing Devices.**—Catalog No. 417 describes the "Universal Noark System" switch, cut-out and meter-testing devices manufactured by the Johns-Pratt Company, Hartford, Conn., for which the H. W. Johns-Manville Company, Madison Avenue, and Forty-first Street, New York, is sole selling agent.

**Oil Pump and Force-Feed Lubricator.**—Bulletin No. 60, issued by the Richardson-Phenix Company, Milwaukee, Wis., contains information on its model M sight-feed oil pump. The company has also issued Bulletin No. 50 on its Models T, S and R force-feed lubricator. Both publications are profusely and attractively illustrated.

**Hydraulic Machinery and Transformers.**—Bulletin No. 1636, issued by the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., contains information on and a large number of photographs and diagrams of hydraulically operated machinery. The company has also issued Bulletin No. 1097 on "Power Transformers," Bulletin No. 1435-A on "Vertical Mill Elevators," and Bulletin No. 1801-A on "The Isbell Vanner."

# Construction News

## New England

AUGUSTA, ME.—The Public Utilities Commission has granted the petition of the Central Maine Pwr. Co., Augusta, to take over the plant and holdings of the Waldoboro El. Lt. & Pwr. Co., which supplies electricity in Waldoboro, Washington, Friendship and Jefferson. The Central Maine Pwr. Co. has also applied to the commissioner for permission to purchase the capital stock of the Bath & Brunswick Lt. & Pwr. Co. of Brunswick.

BANGOR, MAINE.—Financial arrangements, it is reported, have been completed for construction of the Mattawamkeag & Northern Railway, proposing 23 miles of electric railway from Mattawamkeag on the Maine Central to Millinocket and to Bangor and Aroostook. Surveys are being made by the Stone & Webster Engineering Corpn., Boston, Mass. Charles W. Mullen, Bangor, is interested in the project.

BAR HARBOR, ME.—The Bar Harbor & Union River Pwr. Co., Bar Harbor, is contemplating the erection of an electric transmission line from Bluehill Falls to Brooklin and Sedgwick, a distance of 14 miles. Energy will be supplied from the power plant at Ellsworth.

SKOWHEGAN, ME.—The Central Maine Pwr. Co. is planning to extend its electric transmission line from Skowhegan to Athens, via Malbon's Mills and West Ridge Road.

ROYALTON, VT.—The Royalton Pwr. Co. has purchased the local furniture shop and proposes to use the power to supplement its present plant.

BRAINTREE, MASS.—The power plant of the East Braintree Bleachery was recently destroyed by fire.

FRAMINGHAM, MASS.—The Edison El. Illg. Co. of Boston has filed a petition with the Selectmen asking permission to place its wires underground in the business section. The cost of the work is estimated at $40,000. Plans are being considered for a more systematic street-lighting service.

SOUTHWICK, MASS.—The Selectmen are negotiating with the Southwick El. Lt. Co. for lighting the streets of the town and the town building. The company has practically made arrangements with the Amherst Pwr. Co. for energy to operate its system.

WESTFIELD, MASS. — The Westfield Mfg. Co. has applied to the Municipal Lighting Department for electrical service from the municipal electric-light plant to the amount of 200 hp. for use in its plant. A special town meeting will have to be called to authorize the purchase of additional line material and other equipment to enable the plant to furnish the service.

SEYMOUR, CONN.—Bids will be received at the office of the supervising architect, Treasury Department, Washington, D. C., until Dec. 28 for construction complete, including mechanical equipment, except lighting fixtures and approaches, of the United States post office at Seymour, Conn.

## Middle Atlantic

BATAVIA, N. Y.—At a special election held recently the proposal to issue $175,000 in bonds for rebuilding the municipal electric-lighting plant, building a filtration plant and making other improvements to the mechanical equipment of the city was carried.

HERKIMER, N. Y.—The estimates of the Quinn Engineering & Construction Co., Rochester, submitted to the Municipal Commission, place the cost of increasing the output of the municipal electric-light plant and providing for an improved street-lighting system on Main Street at $15,800.

MOUNT MORRIS, N. Y.—The contract for the construction of the new power house for the Mount Morris Wtr. Pwr. Co. on the Genesee River, just below the power dam, has been awarded to Palermo Brothers, Mount Morris.

WATERTOWN, N. Y.—The Public Service Commission has authorized the Northern New York Utilities, Inc., to issue $76,700 in securities to finance extensions and improvements to its system in and around Watertown, including additional equipment at the Black River station, to cost $8,514; additional electric equipment at the Mill Street plant, Watertown, $5,868; estimated cost of completing distribution system at Natural Bridge, $883; steel-tower transmission line (45,000 volts) from Carthage to Taylorville plant, $24,000, and a new ornamental street-lighting system for the city of Watertown, $30,000.

BRACKENRIDGE, PA. — Preparations are being made by the borough of Brackenridge for the installation of a municipal lighting system. Energy for operating the system will be obtained from the borough of Tarentum. Contracts have been awarded to the Western El. Co. for poles and to the Iron City El. Co. for equipment. The work will be done by the borough, which has engaged Sidney B. Martin, Pittsburgh, as consulting engineer, who will work in conjunction with Alfred Thompson, resident engineer.

CORRY, PA.—A committee has been appointed by the Board of Commerce and Industry for the purpose of promoting the project to install an ornamental lighting system in Corry.

LANCASTER, PA.—Application for a charter will soon be made by the Berks-Lehigh El. Co. to supply electricity for lamps, heaters and motors in the township of Lower Macungie, including the borough of Topton. Lawrence B. Myers and John M. Groff, Lancaster, are interested in the company.

ORRTANNA, PA.—A project is reported to be under way to supply a number of residents in the western fruit-belt section of Adams County with electricity. It is proposed to erect a transmission line (about 4 miles long) from the Orrtanna plant to supply the service.

YARDLEY, PA.—The contract for construction of a foundry for the Klauder-Weldon Dyeing Machine Co., Amsterdam, in Yardley, has been awarded to Charles T. Eastburn. The building will be 111 ft. by 78 ft., of fireproof construction. Contracts for steam heating, wiring and sprinklers have not yet been awarded. Pouckert & Wunder, 310 Chestnut Street, Philadelphia, are architects.

NEWTON, N. J.—The Branchville El. Pwr., Wtr. & Ltg. Co., Branchville, has submitted a proposal to the town committee offering to light the streets of Newton for $7,150 annually, provided it is given a ten-year contract. The contract of the Newton Gas & El. Co. expires Jan. 1.

FREDERICK, MD.—Plans submitted to the City Council by C. L. Reeder, consulting engineer, Baltimore, and Dr. John B. Whitehead, professor of electrical engineering of John Hopkins University, Baltimore, for enlarging the municipal electric-light plant place the cost at $103,000. The report provides for the erection of an entirely new plant which will enable the city to supply electricity for lighting the streets and to furnish energy for commercial and power purposes in Frederick.

FAIRMONT, W. VA.—Plans have been completed by J. G. Smyth, Watson Building, Fairmont, for the erection of two brick power houses at Ira and Carolina Mines, Helen's Run, for the Consol. Coal Co., to cost about $6,000 each.

THURMOND, W. VA.—Application has been made by the Mount Hope El. Pwr. & Wtr. Co., Mount Hope, to construct and operate an electric-light, water, sewer, telephone and telegraph system in Thurmond.

WINCHESTER, VA.—The Council has authorized the committee on lights to engage an electrical engineer to make investigations and submit estimates of cost of construction of an electric-lighting system in Winchester.

WASHINGTON, D. C.—Bids will be received at the Bureau of Yards and Docks, Navy Department, Washington, D. C., until Jan. 8, 1916, for two 400-ft. steel towers at radio station, Island of Guam. Plans and specifications may be obtained upon application to the bureau.

## North Central

BAY CITY, MICH.—The City Council has decided to establish an ornamental lighting system throughout the entire business section on the east and west sides of the river.

DETROIT, MICH.—Extensive additions are being made to the power plant of the Studebaker Corporation.

HIGHLAND PARK, MICH.—Bids will be received by R. Milton Ford, village clerk, until Dec. 6 for furnishing one centrifugal pump of 3400 gal. capacity per minute, against a total head of 120 ft., with necessary motor to operate it. Plans and specifications may be obtained at the office of the village clerk, Highland Park.

RAPID RIVER, MICH.—H. E. Pfeifer, Rapid River, is building a transmission line connecting the power plant on Escanaba River with Rapid River. Mr. Pfeifer will supply electrical service in this village and Masonville. W. H. Needham of Escanaba has charge of the work.

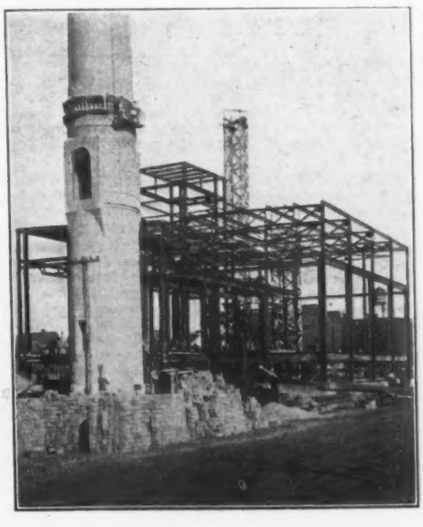
ROCHESTER, MICH. — The Western Knitting Mills are developing a small water-power which, it is estimated, will provide about 70 electric hp. As yet the electrical installation has not been decided upon. A direct-current vertical generating unit is under consideration. The waterwheel will be supplied by the James Leffel & Co., Springfield, Ohio. The generator will probably be purchased within the next two weeks, for which specifications are as follows: 52 kw., 230 volts and 257 r.p.m. The bearings of the generator must be capable of sustaining 3500 lb. thrust in addition to the weight of the armature. C. B. Chapman is treasurer and manager.

ZEELAND, MICH.—At an election held Nov. 8 the proposal to sell the municipal electric-light plant to the Consumers' Lt. & Pwr. Co., Grand Rapids, for $12,000 was carried. Under the terms of the sale the company is to take over the plant by July, 1916.

CLEVELAND, OHIO.—Bids will be received at the office of the commissioner of purchases and supplies, City Hall, Cleveland, until Dec. 3, for rubber-covered, lead-

## New Power Station for the Massachusetts Institute of Technology

The new power station of the Massachusetts Institute of Technology, now under construction at Cambridge, will, at the beginning, develop about 2000 hp. in steam. The new boilers will have a rating of 1560 hp. and those removed from Trinity Place 400 hp., the new ones being of the Babcock & Wilcox pattern with Riley stokers and working under forced draft. The plant will be used as a laboratory for the use of the students, as well as for lighting, heating and power purposes, and will be built on the lines of a large central station. The laboratory use is likely to demand a high peak load, which the plant must be able to care for, but at the same time the load-factor is comparatively low. The electrical outfit is an interesting one, since the engine room will serve for substation as well as for central station. The initial equipment will include three turbines directly connected to three generators, 750 kw., 500 kw. and 150 kw. respectively, furnishing three-phase current at 2300 volts; one 150-kw. turbine and two 150-kw. motor-generators, furnishing direct current at 110 and 220 volts, and two 35-kw. exciters, one driven by steam engine, and one turbine-driven. On the first floor of this building will be installed the engines, including a Curtis turbine of about 75 kw. rating, a 30-hp. Corliss engine with dynamometer attached to flywheel, a 225-hp. McEwen tandem compound engine, a compound engine and generator of the same make of 250 hp. and a triple-expansion Corliss engine. These engines will be ranged along the western wall of the building. On the opposite side of the great laboratory will be a Brown engine driving a three-stage compressor which compresses air to 2500 lb. per square inch. There will be two or three other compressors and several small engines to illustrate different types of prime movers.



incased cable for the Municipal Electric Light Department. Specifications may be obtained on application to the commissioner of light and heat division, 1443 East Third Street, Cleveland.

CLEVELAND, OHIO.—Bids will be received at the office of the commissioner of purchases and supplies, City Hall, Cleveland, until Dec. 1, for furnishing electric-light fixtures for the filtration plant at the Division Avenue pumping station. Specifications may be obtained on application to C. F. Schulz, commissioner of water, 413 Superior Avenue, City Hall, Cleveland.

CLEVELAND, OHIO.—Bids will be received at the office of purchases and supplies, City Hall, Cleveland, until Dec. 3, for oil switches and accessories complete for the East Fifty-third Street main station and West Forty-first Street substation. Specifications may be obtained on application to the office of the commissioner of light and heat division, 1443 East Third Street, Cleveland.

EAST YOUNGSTOWN, OHIO.—Bids will be received by the village of East Youngstown, at the office of the village clerk, Municipal Building, East Youngstown, until Dec. 10, for construction of a 1,000,000-gal. filtration plant, pumping station, pumps, gas engines, pipe lines, standpipe, etc. Plans and specifications may be obtained on application to Carl Anderson, village clerk, East Youngstown, or Chester & Fleming, engineers, Union Bank Building, Pittsburgh, Pa., upon deposit of $25.

ELYRIA, OHIO.—The Lorain County El. Co., a subsidiary of the Cities Service Co., New York, N. Y., it is reported, is contemplating improvements to its station and substation in Elyria and Lorain.

GIRARD, OHIO.—Preparations are being made for the installation of a new street-lighting system in Girard. The plans provide for replacing the arc lamps now in use with 213 tungsten lamps in the residential sections of the city. Ornamental standards will probably be erected in the business district.

MARIETTA, OHIO.—At an election held recently the proposal to issue $45,000 in bonds for the installation of a municipal electric-light plant in Marietta was defeated.

MASSILLON, OHIO.—Improvements are contemplated by the Massillon El. & Gas Co. to its plant on South Erie Street, to cost about $100,000. Contracts, it is reported, have been placed for a new 7500-hp. steam turbine and generators, five 11,000-volt transformers, two boilers, stacks and pumps. F. O. Kennedy is general manager.

MIDDLETOWN, OHIO.—Bids will be received at the office of the supervising architect, Treasury Department, Washington, D. C., until Dec. 18, for the construction complete, including plumbing, gas piping, heating apparatus, electric conduits and wiring, lift and approaches, of the United States post office at Middletown, Ohio.

NEWARK, OHIO.—The Newark Tel. Co. has applied to the Public Utilities Commission for permission to issue $50,000 in capital stock, the proceeds to be used for extensions and improvements to the system.

OVERPECK, OHIO.—Preparations are being made, it is reported, for the installation of an electric-lighting system in Overpeck. Energy to maintain the system will be obtained from Coke Otto.

SALEM, OHIO.—Preliminary steps have been taken by the Municipal Ser. Co., Philadelphia, Pa., for taking over the properties of the Salem El. Lt. & Pwr. Co. and the Columbiana County El. Lt. & Pwr. Co. of Salem, as provided in the franchise recently granted the company. Extensive improvements are contemplated by the Municipal Ser. Co., involving an expenditure of about $100,000. H. T. Hartman, Phidalephia, is president of the Municipal Ser. Co.

TRENTON, OHIO.—Work, it is reported, has begun on the installation of an electric-lighting system in Trenton. Energy to operate the system will be obtained from Coke Otto.

WEST SALEM, OHIO.—The electric-lighting franchise and system in West Salem, formerly owned by John W. Jackson, has been sold to F. L. Berry for $4,400.

YELLOW CREEK, OHIO.—The Kenohio El. Co. it is reported, is planning to install an electric light and power plant at Yellow Creek, Jefferson. For further information address W. J. C. Kenyon, president, 332 South Michigan Avenue, Chicago, Ill.

WANATAH, IND.—The Public Service Commission has authorized the Wanatah El. Co. to issue $9,000 in bonds and $5,000 in capital stock to purchase the local electric-lighting system and transmission lines and also to furnish electricity for lamps, heaters and motors in Wanatah.

DAHLGREN, ILL.—Application has been made by the Dahlgren El. Lt. Co. for a certificate of convenience and necessity to operate an electric-light plant in the village of Dahlgren.

DECATUR, ILL.—The property owners on North Main Street have submitted to the Board of Local Improvements a proposal to extend the ornamental lighting system along that thoroughfare at a cost of about $6,377.

GIRARD, ILL.—The City Council is considering the installation of ornamental lamps around the town square.

HIGHLAND PARK, ILL.—Plans are being considered by the Business Men's Association for the installation of an ornamental street-lighting system in Highland Park.

MARINE, ILL.—The Marine El. Service Co. has applied for a certificate of convenience and necessity to erect a transmission line from Marine to St. Jacobs and from Highlands to St. Jacobs, and also to construct a pole line and distributing system in St. Jacobs.

POPLAR GROVE, ILL.—The Public Utilities Commission has approved an agreement between the Illinois Northern Utilities Co., Dixon, and the Poplar Grove Pwr. Co., whereby the former company will purchase the distributing system owned by the latter and erect an electric transmission line from Capron to Poplar Grove.

SPRINGFIELD, ILL.—The Western Cartridge Co. has awarded the contract for the construction of an electric-power plant, to cost about $100,000, to the Urbauer-Atwood Htg. Co., St. Louis, Mo. The plant will be erected about 5 miles north of this city.

WHEATON, ILL.—Bonds to the amount of $35,000 have been voted for enlarging and extending the water-works system. The improvements will consist of one elevated tank of 200,000 gal. capacity, two 750-gal. per minute centrifugal well pumps, 70 ft. total head, one 500-gal.-per-minute distributing pump, 200 ft. total head, one 100-hp. power unit (probably gas producer and engine), and alterations to the present pumping station. La Verne J. Ruddock is city engineer.

BLOOMINGTON, WIS.—The contract for the installation of an electric-light plant in Bloomington has been awarded to the Globe El. Co., Milwaukee.

BUTTERNUT, WIS.—Steps have been taken by Edward Drott to organize a company to construct and operate an electric-lighting plant in Butternut. The installation of a private plant is reported to be under consideration by W. J. Schultz.

MADISON, WIS.—The Wisconsin River Pwr. Co., Madison, it is reported, contemplates the erection of electric transmission lines in Sauk, Dane and Columbia Counties.

WASHBURN, WIS.—The Commercial Club is considering the installation of an ornamental lighting system on Main Street.

CLIMAX, MINN.—The town of Climax is reported to be installing a municipal electric-lighting plant.

ELK RIVER, MINN.—The hydroelectric plant now being built on Elk River by F. A. Waterman, it is expected, will supply electricity in Elk River by the latter part of December. C. F. Walters will be manager of the plant.

MINNEAPOLIS, MINN.—Bids will be received by the Board of Education, Minneapolis, until Dec. 6, for construction of the John Ericsson School, including general work, plumbing, heating and ventilating, wiring and temperature control. Plans are on file at the Minneapolis Builders' Exchange and at the office of R. V. L. Haxby, architect, board of education, for general work, and at the office of Rose & Harrison for mechanical equipment, copies of which may be obtained upon deposit of $20. George F. Womrath is business superintendent.

MONTROSE, MINN.—The installation of an electric-lighting system in Montrose is reported to be under consideration.

ROCHESTER, MINN.—Bids will be received by the Public Utility Board, Rochester, until Dec. 8 for equipment for the municipal electric-light plant as follows: For two 260-hp. water-tube boilers, mechanical stokers for four boilers, economizers and induced-draft equipment, chimney, steel breeching and flues, overhead coal bunkers, coal crusher and conveying equipment, a 750-kw. turbo-generator and condenser, switchboard, condenser for two engines, crane for engine room, electric elevator and industrial rail and ash car. Proposals may be submitted on any division or on any part or parts of the entire equipment. A new $45,000 power station is now being erected and new machinery, together with a part of the equipment from the old power plant, is to be installed. The new plant will have a rating of 1725 hp. in generators and 1040 boiler-hp. The municipal plant was not damaged to the extent that it was first thought to be, and a part of the machinery was put into service four days after the fire. Sufficient equipment is in use to take care of nearly all the load. A 625-kw. Westinghouse steam turbine is now being installed, which will be removed to the new power plant now being erected. It is expected that the new plant will be in operation by May 1, 1916. Plans and specifications for the new plant may be obtained from the Charles L. Pillsbury Co., 805 Metropolitan Life Building, Minneapolis, Minn., consulting engineer.

ST. PAUL, MINN.—Improvements involving an expenditure of about $7,000 on the fire-alarm system are contemplated. The work will include the installation of insulated alarm boxes to replace some of the older boxes, a new switchboard for the central operator, and an electric map showing the locations of all the fire stations of the city.

ELDRIDGE, IOWA.—The Town Council has granted Otto R. Wuestenberg permission to erect transmission lines to supply electricity in the business district of the town. Mr. Wuestenberg is installing an electric plant in connection with a new garage.

FORT DODGE, IOWA.—At an election held recently the proposal to issue $100,000 in bonds for the construction of a power dam in the Des Moines River at the north edge of the city was carried.

IMOGENE, IOWA.—The installation of an electric-lighting system in Imogene is under consideration. It is proposed to secure the service from either Shenandoah, Malvern or Tabor.

LOW MOOR, IOWA.—Bonds to the amount of $4,500 have been authorized for the installation of an electric-lighting system.

MARENGO, IOWA.—The Iowa El. Co., Marengo, has applied to the Board of Supervisors of Jones County for a franchise to erect and maintain electric transmission lines along the highways of Jones County.

RICHLAND, IOWA.—Preparations are being made by the Richland El. Lt. Co. to erect electric transmission lines to Brighton and Ollie. Electrical service will also be supplied to farmers residing along the line.

TITONKA, IOWA.—An election will soon be called to submit the proposal to grant Halbert Merrifield, Mankato, a franchise to install an electric-lighting system in Titonka.

CLEARMONT, MO.—Preparations are being made by Jesse Baker for the installation of a small electric plant at his repair shop. Mr. Baker proposes to furnish electricity to light several of the buildings near his property, and if the service is satisfactory he may enlarge the plant and extend the service throughout the town.

KANSAS CITY, MO.—The Squire El. & Construction Co., Kansas City, has been awarded the contract by the Kaw Valley Drainage Board for the electrical installation of a dredge boat to be used this winter in clearing the channel of the Kaw River. The plans call for a 1000-hp. installation and include a 750-hp. slip-ring, three-phase, 2300-volt motor, secondary control, for driving a centrifugal pump for dredging; a 75-hp. motor on a two-stage centrifugal pump, and a 25-hp. motor on a single-stage pump; a 50-hp. motor will operate through a converging shaft on a cutter ahead of the suction. Among the minor equipment are a 25-hp. motor on drums for hoisting and handling the suction tube and a motor-generator set for operating the searchlight and the lamps to be strung on board. Energy for operating the dredge will be supplied by the municipal electric-light plant at Kansas City, Kan. The company has also secured the contract for electrical work, wiring, motors for heating and ventilating, etc., for the administration building of the Warrensburg Normal School; also the electrical contract for the manual-training building at Warrensburg.

MONETT, MO.—The contract with the Ozark Wtr. & Pwr. Co., Branson, for furnishing electricity to operate the municipal electric plant for a period of ten years has been approved by the voters.

NEW MADRID, MO.—Bids will be received by W. H. Copeland, city clerk, New Madrid, until Nov. 29 for additions to the municipal electric-light plant. H. H. Humphrey, Chemical Building, St. Louis, is consulting engineer.

KILLDEER, N. D.—The installation of an electric-lighting system in Killdeer is under consideration.

NEWBERG, N. D.—The installation of an electric-lighting system in Newberg is reported under consideration. H. C. Martin is said to be interested in the project.

CHANCELLOR, S. D.—The Town Council has authorized plans to be prepared for a municipal electric-light plant.

HARTFORD, S. D.—Preparations are being made by the Hartford Lt. & Pwr. Co. to rebuild its plant, recently damaged by a storm. O. J. Grounsdahl is secretary and manager.

AURORA, NEB.—Bids will be received at the office of the supervising architect, Treasury Department, Washington, D. C., until Dec. 22, for construction, including mechanical equipment and approaches, of the United States post office at Aurora, Neb.

DIXON, NEB.—The proposal to issue bonds for the installation of an electric-lighting system in Dixon will soon be submitted to the voters. It is proposed to secure electricity to operate the system from the new plant in Laurel.

HEARTWELL, NEB.—The Heartwell Wtr., Lt. & Pwr. Co. has been granted a franchise to install and operate an electric-light plant and water-works system in Heartwell for a period of twenty-five years.

LINCOLN, NEB.—Plans have been completed for the erection of Terminal Building (85 ft. by 142 ft., ten stories high) for the Lincoln Trac. Co.

BELLEVILLE, KAN.—Bids, it is understood, are being asked for equipment and installation of an ornamental street-lighting system in Belleville.

LAWRENCE, KAN.—The Lawrence Ry. & Lt. Co., it is reported, has offered to pay $1,000 toward the expense of equipment of an ornamental lighting system. The remainder (about $3,000) will be raised by a special tax.

## Southern States

ELKIN, N. C.—The Chatham Mfg. Co., Elkins, it is reported, is planning to install an electric-power plant to supply electricity to operate its woolen mills and other manufacturing plants.

ORANGEBURG, S. C.—Bids will be received by the Mayor and Councilmen of the city of Orangeburg until Dec. 3 for furnishing and erecting on foundations furnished by the city two 275-hp. water-tube boilers, designed for a working pressure of 160-lb. gage. T. O. S. Dibble is city clerk and treasurer.

METTER, GA.—At an election to be held in December the proposal to issue $25,000 in bonds will be submitted to the voters. Of the proceeds $7,500 will be used for an electric-light plant and $12,500 for water-works system.

FORT PIERCE, FLA.—Plans are being considered for extension to the electric-lighting system, for which bonds have been authorized.

ST. CLOUD, FLA.—The City Council has engaged Wilbur A. Ginn, Sanford, as engineer in connection with water-works, electric-light plant and street improvements.

CAMDEN, TENN.—The Camden El. Lt. Co., recently incorporated, is planning to install a new electric plant. The equipment will include one Westinghouse 150-kva., 60-cycle alternating-current generator, Westinghouse switchboard and transformers.

CLARKSDALE, MISS.—Bids will be received by the Commissioners of Clarksdale until Dec. 14 for furnishing material for improvements to the municipal electric-light plant and water-works system as follows: One 350-hp. water-tube boiler, one guyed steel stack, one 500-hp. open feed-water heater with metering device, one 30-gal.-per-minute motor-driven centrifugal boiler-feed pump, one 500-gal.-per-minute motor-driven pump for water-works, one $CO_2$ and draft recorder with low alarm, four feed-water regulators, one half-ton electric (delivery type) truck. Also equipment for industrial railway as follows: Two 1-ton drop-side steel charging cars, one right-hand cast plate switch, one 3-ton cast plate, boiler-room scales with hand-registering device, 500 ft. (single) No. 16 rail with four-bolt fishplates and bolts. Specifications are on file in the office of the city clerk, and copies may be obtained upon application there, or to W. G. Shurger Engineering Co., Meridian, Miss., consulting engineer.

MONTICELLO, ARK.—The Town Council has entered into a contract with the board of trustees of the Fourth District Agricultural School to supply that institution with electricity for lamps and motors. Heretofore the school has operated its own plant.

HEAVENER, OKLA.—Bonds to the amount of $20,000 have been voted for the installation of a municipal electric-lighting plant in Heavener.

RINGLING, OKLA.—H. E. Foster, owner of the local ice factory, is planning to install an electric-light plant. Equipment for the proposed plant, it is understood, has been purchased.

SHAMROCK, OKLA.—The Sapulpa & Oil Fields R. R. Co. is contemplating the installation of an electric power plant to supply electricity for operating machinery in the oil fields and also for railroad use. High-tension lines will be used. J. A. Frates, Springfield, Mo., general superintendent of the St. Louis & San Francisco Ry., is president of the Sapulpa & Oil Fields Co.

WESTVILLE, OKLA.—Bonds to the amount of $10,000 have been voted for the purchase of the local electric-light plant.

DALLAS, TEX.—Plans are being prepared by the Dallas Union Terminal Co. for power plant, to cost about $40,000, and two signal towers, to cost $20,000.

FORT SAM HOUSTON, TEX.—Bids will be received at the office of the constructing quartermaster, Fort Sam Houston, until Dec. 13, for furnishing and installing an interior and exterior lighting system. Further information may be obtained at the above office.

PLAINVIEW, TEX.—The Texas Utility Co., recently organized by H. Wurdack, St. Louis, Mo., and others, has purchased the electric light and power plant, water-works system and ice factory in Plainview and Lockney, and has acquired about 75 miles of transmission lines in Floyd, Hale and Lubbock Counties. The company is said to be negotiating for similar industries in other towns in this region and proposes to extend the transmission system of the central station at Plainview and furnish energy to operate irrigation pumping plants and for other industries.

SULPHUR SPRINGS, TEX.—The City Commission has contracted for 45 additional arc lamps in the business district and for a large number of additional incandescent lamps to be placed in the residential districts. Ornamental standards will be used.

## Pacific States

ALDER, WASH.—The City Council of Tacoma has voted to furnish the town of Alder with electricity from the municipal electric plant at La Grande, provided that Alder erects its own transmission line.

OAKVILLE, WASH.—The property of the Oakville Lt. & Pwr. Co. has been purchased by Frank Leisner, Oakville. The new owner, it is understood, will make improvements to the service.

RITZVILLE, WASH.—Application has been made to the Council by H. B. Spear for a franchise for the Ritzville Central Htg. Co. to construct and operate a heating and electric plant in Ritzville for a period of twenty-five years.

SEATTLE, WASH.—Provided that the city of Seattle will withdraw its application for water rights on the Sauk-Suiattle River, filed less than a year ago, the American Nitrogen Products Co., capitalized at $750,000, will, it is reported, begin work at once on the construction of a nitrate plant. The initial power-plant installation provides for a development of about 2000 kw., to cost about $100,000, with an ultimate development of 100,000 kw. The matter has been referred to A. H. Dimmock, city engineer, J. D. Ross, superintendent of lighting, and James E. Bradford, corporation counsel.

TACOMA, WASH.—The City Council, which last year revoked the privilege of the Puget Sound Trac., Lt. & Pwr. Co., which owns and operates the local power plant and traction system, to sell energy for power purposes, has returned the company its franchise granting this privilege. The agreement includes the uniting of the municipal plant with that of the Puget Sound company, to be used as an auxiliary, and it also provides for an extension of the Pacific Avenue car line of the Tacoma Ry. & Lt. Co. and for the construction of a short line to South Tacoma, over the new Tacoma Avenue fill.

ALBANY, ORE.—The City Council has granted William Hoeflich a franchise to install and operate an electric-light plant in Albany.

GRANT'S PASS, ORE.—W. B. Sherman, Grant's Pass, has been granted permission by the State Engineer to appropriate 1000 second-ft. of water of the Rogue River at Hell Gate for the development of an irrigation and power project, involving an expenditure of about $200,000.

INDEPENDENCE, ORE.—The Oregon Pwr. Co. is planning to extend its electric transmission lines to Buena Vista to furnish electrical service in that village and also to farmers residing along the line. A. L. Martin is local manager.

LAPINE, ORE.—The property of the Pringle Falls Wtr. & Pwr. Co., Lapine, was recently sold to a syndicate of Eastern capitalists, headed by Thomas Brothers of Nebraska. The consideration, it is understood, was $300,000. The new company, it is understood, proposes to supply electrical energy for the irrigation of the entire Lapine Basin and Eden-Coules, Silver Lake and Fort Rock Valleys. Electricity for lamps and motors in Lapine will be among the first steps in the proposed development. The power station, which is practically completed, will be equipped with electric generating equipment immediately.

OSWEGO, ORE.—The contract for furnishing motors, transformers and other equipment necessary for the operation of the Oregon-Portland Cement Co., Oswego, has been awarded to the Portland office of the Westinghouse El. & Mfg. Co.

ESCONDIDO, CAL.—An election has been called to submit to the voters the proposal to issue $40,000 in bonds for the installation of a municipal electric-light plant in Escondido.

FRESNO, CAL.—Plans have been adopted by the Council for electrolier lighting system No. 2, and a resolution to install the same was passed. Electroliers similar to those in the business district will be erected on J Street between Merced and Tuolumne Streets and on Tuolumne from I to J Street.

LA MANDA PARK, CAL.—At an election held recently the proposal to issue $25,000 in bonds for the installation of an ornamental lighting system in La Manda Park was carried.

SANTA ROSA, CAL.—The Board of Supervisors has entered into an agreement with the Pacific Gas & El. Co., San Francisco, to supply electricity for lamps and motors for the county hospital and farm. Lines will be extended to the hospital at once.

HAILEY, IDAHO.—The plant and holdings of the Hailey El. Co. have been purchased by Ferris Brothers, La Crosse, Wis., who are also negotiating for the property of the Rockwell-White Co., Bellevue. When the latter deal is carried through both plants will be consolidated and placed under the management of John T. Hart, manager of the Hailey plant. The new owners propose to increase the output of both plants and supply electricity to the various mining properties in the vicinity of Hailey.

RATHDRUM, IDAHO.—The plant of the Rathdrum El. Co. has been purchased by Ralph Y. Poole, Ouray, Col. The transfer includes the lighting, heating and power system at Post Falls. The new owner, it is understood, will make extensions and improvements to the system.

EAST SCOBEY, MONT.—The Scobey El. Lt. Co. is reported to be contemplating the installation of additional machinery to meet the increasing demands for electrical service.

PINOS ALTOS, N. M.—The Empire Zinc Co. has been granted permission by James A. French, state engineer, to take water from arroyos in the Pinos Altos district of Grant County to create a storage reservoir at Pinos Altos, the water to be used for mining, milling and power purposes.

## Canada

GRANTHAM, ONT.—The by-law authorizing the village of Grantham to enter into a contract with the Ontario Hydro-Electric Power Commission has been approved by the ratepayers. The municipality will be served from the town of Lucan. Grantham has not a post office..

IBERVILLE, QUE.—The Southern Canada Pwr. Co., which controls the St. Johns El. Lt. Co., St. Johns, has submitted a proposal to the town of Iberville offering to purchase the municipal electric-light plant. The St. Johns company already does the larger part of the electrical business, the municipal plant supplying night service only. F. A. Chisholm is manager.

## Miscellaneous

PANAMA.—Bids will be received at the office of the general purchasing officer, the Panama Canal, Washington, D. C., until Dec. 8 for furnishing centrifugal pumps, steel and iron castings, sheet copper, drills, drill sockets, pipe dies, copper ferrules, gages, grease cups, valves, cocks, water-gage lamps, etc. Blanks and general information relating to this circular (No. 992) may be obtained from the above office or the offices of the assistant purchasing agents, 24 State Street, New York, N. Y.; 614 Whitney Building, New Orleans, La., and Fort Mason, San Francisco, Cal. Major F. C. Boggs is purchasing officer.

# Weekly Record of Electrical Patents

UNITED STATES PATENTS ISSUED NOV. 16, 1915.

[Prepared by Mitchell & Allyn, 41 Park Row, New York.]

1,160,010. Electrical Device; M. Setter, Chicago, Ill. App. filed Dec. 6, 1906. Combined drop and jack.

1,160,125. Dictograph Intercommunicating Telephone System; W. P. Andrick, Jamaica, N. Y. App. filed Oct. 10, 1913. For factories and business purposes.

1,160,133. Means for Circulating Electrolyte; W. L. Bliss, Niagara Falls, N. Y. App. filed March 26, 1912. Uses rotary pump.

1,160,177. X-Ray Tube; E. W. Kelly, Philadelphia, Pa. App. filed June 27, 1914. Special cooling means.

1,160,181. Machine Telephone Switching System; F. R. McBerty and D. Koenig, Antwerp, Belgium. App. filed March 2, 1914. Power-driven registering and controlling apparatus.

1,160,187. Plug Receptacle Box for Electric Circuits; W. F. Meschenmoser, New York, N. Y. App. filed April 2, 1910. Protected terminals.

1,160,188. Signal Transmitters; C. Miller, New York, N. Y. App. filed May 29, 1914. Fire-alarm or messenger box.

1,160,244. Treating Materials in Electric Furnaces; E. S. Berglund, Trollhättan, Sweden. App. filed April 21, 1915. Introduces substance capable of forming an easily fusible slag.

1,160,261. Method of Electric Welding and Apparatus for Use Therein; W. B. Cleveland, Burton, Ohio. App. filed Oct. 16, 1909. Welding bonds to rails.

1,160,289. Electrical System of Distribution; J. W. Jepson, Depew, N. Y. App. filed July 25, 1914. Car lighting.

1,160,294. Selective Signaling System; O. M. Leich, Genoa, Ill. App. filed April 14, 1911. Harmonic ringer.

1,160,315 Elevator Signaling Apparatus; E. R. Newell, New York, N. Y. App. filed June 6, 1908. Restoration of signals controlled by doors

1,160,327. Homogenizing and Heating Device for Gaseous Fuel; E. P. Ross, Freeport, N. Y. App. filed May 12, 1915. Mixes and heats gaseous fuel.

1,160,344. Electrical System of Distribution; W. A. Turbayne, Lancaster, N. Y. App. filed Jan. 26, 1909. Charging storage battery.

1,160,345. Convertible Direct or Indirect Lighting Fixtures; F. W. Wakefield, Vermilion, Ohio. App. filed Jan. 19, 1914. Reflector can be reversed for direct or indirect lighting.

1,160,346. Clock Mechanism; H. E. Warren, Ashland, Mass. App. filed Nov. 30, 1914. Pendulum magnetically coupled to time train.

1,160,357. Electrical Transformers; R. F. Agnew, Cleveland, Ohio. App. filed March 3, 1909. Advantages of cast and laminated construction.

1,160,371. System for Operating Burners by Means of Liquid Fuel; C. A. Brown, Hinsdale, Ill. App. filed Nov. 22, 1913. Vaporizing means for boilers.

1,160,386. Fuse Carrier; J. J. Crouse, Waterbury, Conn. App. filed Aug. 10, 1914. Limited amperage.

1,160,388. Ignition Apparatus for Internal-Combustion Engines; L. C. Daucher, Suresnes, France. App. filed May 22, 1913. Visible spark-gaps.

1,160,400. Electrolytic Process of Detinning; H. Goldschmidt, Essen-on-the-Ruhr, Germany. App. filed Feb. 5, 1908. Detins scrap by alkaline electrolyte.

1,160,401. Electrolytic Detinning System; H. Goldschmidt, Essen-on-the Ruhr, Germany. App. filed Feb. 5, 1908. Closed-conduit electrolyte circulating system.

1,160,416. Selective Controller for Vehicle-Call Systems; J. H. Kilegl, New York, N. Y. App. filed July 8, 1913. Improved contact-making devices.

1,160,435. Electric-Lamp Retaining Device; H. J. Morey, Syracuse, N. Y. App. filed Oct. 19, 1914. Wire retainer applicable to ordinary socket.

1,160,447. Machine-Telephone Switching System; L. Polinkowsky, Brussels, Belgium. App. filed March 5, 1914. Automatic switch searches for and seizes idle circuit.

1,160,469. Machine for Producing Electrical Coils; C. R. Underhill, New Haven, Conn. App. filed Jan. 22, 1914. Spirally wound insulation tapes.

1,160,472. Device for Regulating the Speed of Motor Cars; J. G. Wallmann, Oakland, Cal. App. filed May 16, 1914. Gives power automatically when required.

1,160,488. Electrical Resistance; C. O. Bastian, London, Eng. App. filed June 22, 1915. For electric radiators, etc.

1,160,491. Battery; P. Brown, Springfield, Mass. App. filed March 22, 1915. Storage; special venting.

1,160,496. Burglar and Signal Device; A. Casper, Vallejo, Cal. App. filed Dec. 5, 1914. Indicator gives warning of unlawful entry.

1,160,518. Pocket Flashlight; A. S. Lyhne, Bridgeport, Conn. App. filed Dec. 26, 1914. Pistol type.

1,160,531. Attachment Plug; H. P. Rounds, Detroit, Mich. App. filed Oct. 31, 1913. Avoids twisting of wires.

1,160,534. Coupling; A. Schmidt, Flint, Mich. App. filed July 16, 1912. For spark plugs and the like.

1,160,543. High-Voltage Strain Insulator; L. Steinberger, Brooklyn, N. Y. App. filed April 18, 1910. Designed for transmission lines, etc.

1,160,544. Insulating Support for High-Tension Conductors; L. Steinberger, Brooklyn, N. Y. App. filed July 3, 1911. Rod type.

1,160,545. Mouthpiece; L. Steinberger, Brooklyn, N. Y. App. filed Feb. 10, 1912. For telephone transmitters.

1,160,546. Disk Strain Insulator; L. Steinberger, Brooklyn, N. Y. App. filed Jan. 3, 1913. Has concentric ridges.

1,160,547. Electrical Connection for Electric Relays; C. Stille, Zehlendorf-West, near Berlin, Germany. App. filed March 21, 1914. Sounds repeated with greater clearness.

1,160,567. Method of and Means for Calibrating Electric Meters; O. T. Bláthy, Budapest, Austria-Hungary. App. filed Sept. 7, 1912. Uses a breaking magnet.

1,160,570. Prepay Box for Use in Telephone Systems; O. Brisbois, Chicago, Ill. App. filed Feb. 8, 1915. For party lines.

1,160,608. Electrical System of Distribution; A. S. Hubbard, Belleville, N. J. App. filed Dec. 17, 1908. Load on main and storage sources is varied.

1,160,609. Electrical System of Distribution; A. S. Hubbard, Belleville, N. J. App. filed March 1, 1909. For electric railways.

1,160,610. Alternating-Current Apparatus; A. S. Hubbard, Belleville, N. J. App. filed Aug. 7, 1909. Produces pulsating direct current from alternating current.

1,160,619. Electric Attachment Device; C. J. Klein, Milwaukee, Wis. App. filed Nov. 20, 1911. Prongs on insertible plugs actuate snap switch.

1,160,620. Electric Switch; C. J. Klein, Milwaukee, Wis. App. filed Nov. 20, 1911. For lamp clusters.

1,160,661. Incandescent Lamp; F. Skaupy, Berlin, Germany. App. filed March 9, 1912. Gas slowly given off during operation of lamp.

1,160,673. Series-Parallel Control System; J. F. Tritle, Schenectady, N. Y. App. filed Dec. 26, 1913. For railway motors.

1,160,674. System of Control for Electric Motors; J. F. Tritle, Schenectady, N. Y. App. filed Dec. 26, 1913. Semi-automatic railway.

1,160,702. Insulator; G. Faccioli, Pittsfield, Mass. App. filed Sept. 25, 1914. Contains liquid dielectric.

1,160,705. Method of and Means for Operating Synchronous Dynamo-Electric Machines; W. J. Foster, Schenectady, N. Y. App. filed Aug. 30, 1913. During starting period.

1,160,714. Electrically Controlling System for Moving-Picture Theaters; J. H. Hirschberg, Oakland, Cal. App. filed Oct. 2, 1911. Automatically controls operation of projector, piano, etc.

1,160,715. Equalizing Means for Three-Truck Locomotive; F. B. Howell, Schenectady, N. Y. App. filed Oct. 10, 1914. Arrangement of equalizing beams.

1,160,716. Electrical Apparatus; A. Hundt, Pankow, Germany. App. filed May 25, 1915. Transformer winding.

1,160,717. Alternating-Current Dynamo-Electric Machine; L. J. Hunt, Sandcroft, Wales. App. filed March 14, 1914. Alternating-current winding.

1,160,745. Filament Support; M. M. Merritt, Middleton, Mass. App. filed July 18, 1910. Flexible filament supports.

1,160,749. System of Electrical Distribution; G. S. Neeley, St. Louis, Mo. App. filed May 15, 1911. Battery charging.

1,160,750. System of Distribution; H. F. Perkins, Schenectady, N. Y. App. filed May 5, 1913. Vapor-electric apparatus.

1,160,754. Honeycomb Decapping Knife; O. B. Poore, Aurora, Minn. App. filed Nov. 1, 1913. Electrically heated.

1,160,766. Signaling Device; R. R. Root, Cleveland, Ohio. App. filed Jan. 30, 1914. Automobile horn.

1,160,771. Apparatus for Driving Electrical Machines; A. Schalkau. Schöneberg, near Berlin, Germany. App. filed March 5, 1912. Includes a current indicator.

1,160,795. Fire-Alarm System; F. X. Veranich, West Allis, Wis. App. filed Jan. 12, 1915. Thermostatic electric system.

1,160,811. Method of Producing Nitrogen Compounds; C. E. Acker, Ossining, N. Y. App. filed Sept. 2, 1910. Separates alkali from molten metallic bath.

1,160,842. System of Electrical Distribution; F. Castiglioni, Wilmette, Ill. App. filed Aug. 28, 1912. Prevents electrolysis in underground pipes, etc.

1,160,844. Arcing Ground Suppressor; A. Chernyshoff, Swissvale, Pa. App. filed Oct. 3, 1914. Protects conductors from abnormal stresses.

1,160,847. Electrolysis of Alkali Chlorides or Alkali Earth Chlorides; A. Clemm, Mannheim, Germany. App. filed Oct. 16, 1913. Vertical diaphragm.

1,160,859. Electric-Lighting Fixture; J. H. Dale, New York, N. Y. App. filed April 25, 1914. Indirect, pull-socket construction.

1,160,860. Electric-Lighting Fixture; J. H. Dale, New York, N. Y. App. filed Nov. 19, 1914. Convertible from direct or indirect lighting.

1,160,876. Sender-Board Apparatus; E. R. Gill, Yonkers, N. Y. App. filed May 25, 1910. Construction of sending devices.

1,160,900. Mechanically Actuated Diaphragm Horn; M. R. Hutchison, Summit, N. J. App. filed May 5, 1909. Relatively adjustable diaphragm and vibrator.

1,160,902. Diaphragm Horn; D. A. McConnell, Arlington, N. J. App. filed April 2, 1913. Partly forced and partly free vibrating diaphragm.

1,160,907. Dry Battery; I. Koretzky, New York, N. Y. App. filed April 4, 1913. Particularly for flashlamps; uses recovered manganese depolarizer.

1,160,921. Electric Switch; J. F. McElroy (deceased), Albany, N. Y. App. filed Aug. 11, 1911. Switch normally centralized by spring.

1,160,951. Automatic Trunking System; O. V. Olson, Chicago, Ill. App. filed June 12, 1909. Prevents excess motion of the switches.

1,160,959. Controlling Apparatus for Electric-Railway Cars; A. Sundh, Yonkers, N. Y. App. filed Nov. 11, 1905. Speed dependent on accelerating means.

1,160,960. Surge-Proof Transformer; C. H. Thordarson, Chicago, Ill. App. filed Oct. 6, 1913. Uses a few turns of special winder.

1,160,993. Railway Signaling System and Apparatus; C. J. Coleman, New York, N. Y. App. filed Sept. 22, 1908. For electric railways with abnormally long blocks.

1,160,994. Pay-Station Telephone System; J. Erickson, Chicago, Ill. App. filed Nov. 12, 1906. Secondary of subscriber's induction coil is short circuited in first calling.

1,160,995. Magneto-Electric Machine; J. B. Frawley, Pittsfield, Mass. App. filed Jan. 31, 1912. Lessens demagnetizing effects of eddy currents.

1,160,999. Galvanic Cell; M. L. Kaplan, Brooklyn, N. Y. App. filed Dec. 24, 1914. Coats graphite with manganese peroxide.

14,010 (reissue). Selective Signaling System; E. R. Gill, Yonkers, N. Y. App. filed Aug. 26, 1912 (original patent No. 1,020,975, dated March 26, 1912). Telephonic train dispatching.

14,012 (reissue). Method of and Apparatus for Selective Wireless Telegraphy; F. G. Sargent, Westford, Mass. App. filed Oct. 29, 1914 (original patent No. 1,091,768, dated March 31, 1914). Uses synchronously revolving indicators.